Deep Freezer Series

User Manual, version 3.0 07/08/07

ilShin Europe
Kryptonstraat 11
6718 WR EDE
The Netherlands

info@ilshineurope.com
www.ilshineurope.com

tel: +31 318 64 64 81
fax: +31 318 64 60 34

Failure to read, understand and follow the instructions in this manual may result in damage to the unit, injury to operating personnel and poor equipment performance

Quick Installation Guide

1. Recommended room conditions

a. Recommended room temperature: between 5 ºC and 28 ºC;

*If the room temperature is normally > 30 ºC please install suitable air-conditioning.

b. Make sure the floor is level and even;

c. Make sure the condenser grid is not blocked (adequate air circulation is required);

d. Install the two spacer pins on the back of the freezer to allow heat dispersion behind the freezer; *fig.1*

Fig.1

2. Turning Freezer on

=> always start-up the freezer empty!

a. Push the power plug firmly into the power socket (please check you have the correct voltage);

b. Make sure the mains power switch at the back of the freezer is switched ON (Switched upwards); *fig.2*

Fig.2

c. Turn the key switch (on control panel) to ON position;

3. Recommended set points

a. set-point – 80 ºC

b. cold alarm – 90 ºC

c. warm alarm – 70 ºC

These set points are factory set and gives the freezer the optimum conditions for prolonged life.

4. Recommended maintenance

a. We recommend the condenser filter is cleared of dust every month;

b. We recommend that ice is removed from the door seals every month;

c. We recommend a maintenance visit by your local dealer on an annual basis.

We wish you a quick and trouble free installation!

IMPORTANT: WARRANTY AND ROOM TEMPERATURE

This unit is equipped with the WarmMark indicator (near serial tag):

1. In case this WarmMark is removed from the product, warranty will be terminated.
2. In case the room temperature climbs above +33 ºC for a long period of time, a red colour gradually moves through the window of the WarmMark Indicator. Every window which is indicated red will decrease warranty period with 1 year.

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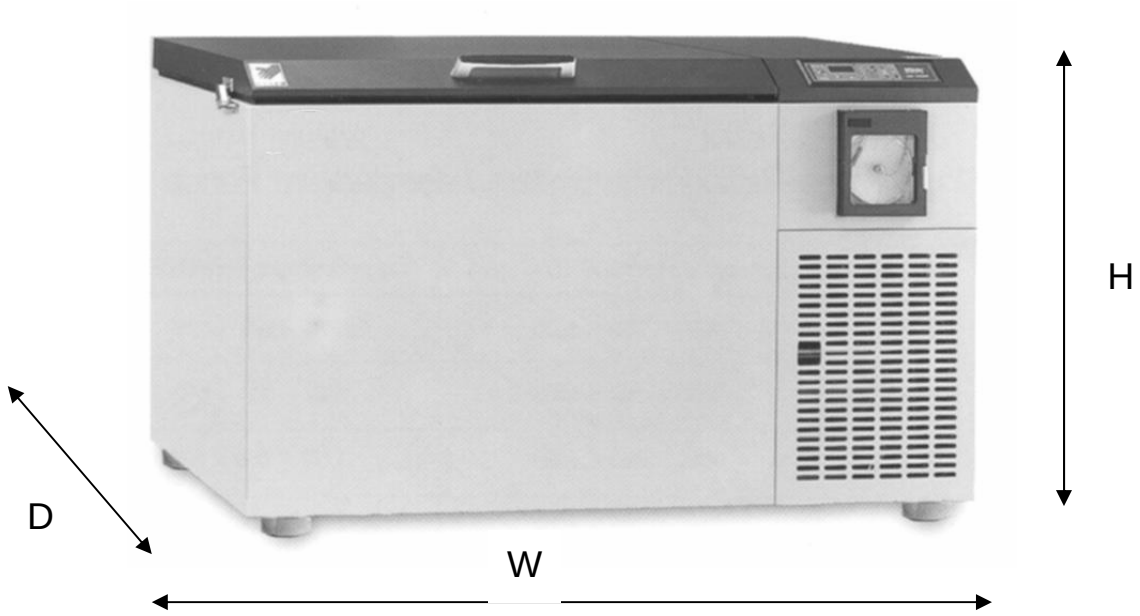
1. Dimensions of the freezer models

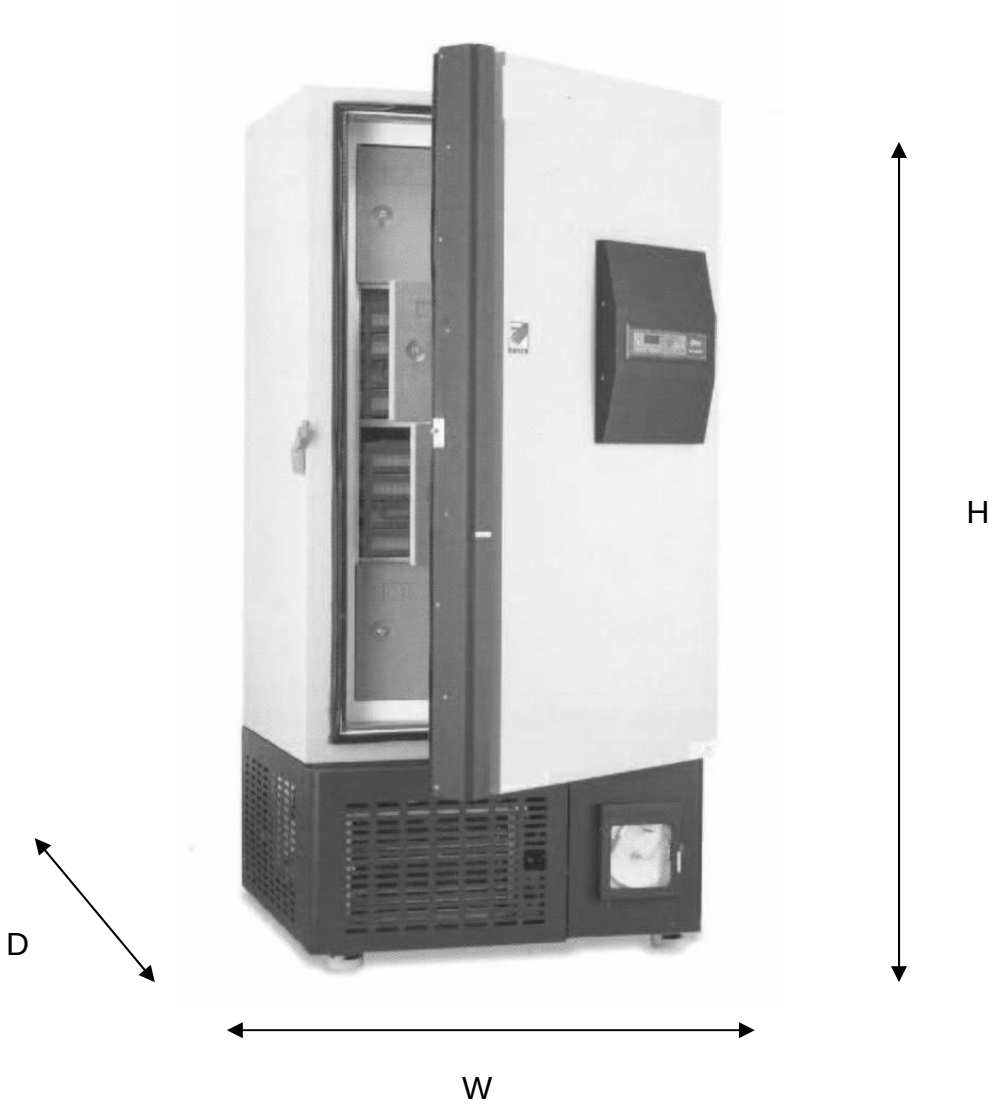
1.1 Chest Model



Model No.	Exterior Dimensions W x D x H	Interior Dimensions W x D x H	Capacity (L)
DF4507 DF9007	1280x790x1030mm	570x500x670mm	191
DF4510 DF9010	1590x790x1030mm	870x500x670mm	295
DF4515 DF9014	1880x790x1030mm	1170x500x670mm	392
DF4517 DF9017	2180x790x1030mm	1470x500x670mm	492
DF4520 DF9020	2480x790x1030mm	1770x500x670mm	593

* The operating temperature of Model DF45** is - 20 °C to – 45 °C , and for the Model DF90 –40 °C to – 86 °C . In addition, if the last two numbers (**) of the model are the same, the same operating temperature is applicable.

1.2 Upright Model



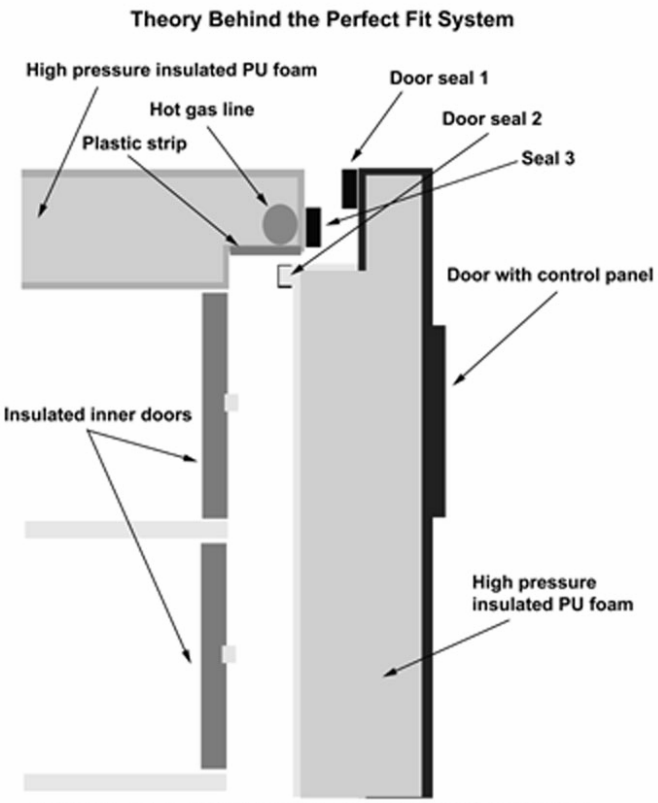
Model No.	Exterior Dimensions W x D x H	Interior Dimensions W x D x H	Capacity(L)
DF3510 DF8510	920x900x1740mm	600x480x960mm	276
DF3514 DF8514	920x900x1979mm	600x480x1280mm	369
DF3517 DF8517	920x1050x1979mm	600x630x1280mm	484
DF3520 DF8520	1070x1050x1979mm	750x630x1280mm	605
DF3524 DF8524	1070x1180x1979mm	750x760x1280mm	730

* The operating temperature of Model DF35** is -20 °C to – 45 °C , and for the Model DF85 ** this is –50 °C to –86 °C . In addition, if the last two numbers (**) of the model are the same, the same operating temperature is applicable.

2. Specifications

2.1 Deep Freezer Charicteristics

1. Hermetically sealed cooling system with very durable compressors
2. Cold air loss is minimized by insulated inner doors
3. Efficient evaporator with maximum contact with walls for fast cooling down
4. 130 mm polyurethane foamed insulation
5. Heavy-duty casters with built in adjustable stands
6. Cabinet with round corners for easy cleaning
7. 3 Built-in access ports
8. Very user-friendly control panel at eye level
9. Easy to clean condenser filter
10. Pressure equalization port allows easy access to cabinet after door closing
11. Quiet running fans and compressors create a very low noise level (<50 dBa)
12. Heated door seals (hot gas) prevent ice to build up



The hot gas line prevents ice building up at the sides of the door and cabinet. The plastic strip prevents direct contact between the metal cabinet housing and the door / air. Direct cold conduction (ice) is prevented. Insulated inner doors prevent cold loss from the individual compartments. The unique 3-door-seal-system ensures a tight door closing with as result a minimum of ice.

2.2 Chest Model Specifications

Model No.	Capacity (L)	Weight (Kg)	Lowest Temp. °C	Usage Temp. °C	Electrical (V, Hz)	Electical (Hp)	Insulation	Const-rution
DF4507	191	185	-45	-20 ~-40	200/230, 50/60	1/2	Foamed In place Poly urethane	Textured steel or stainless steel (optional)
DF9007		211	-86	-60~ -80		1/2×2ea		
DF4510	295	205	-45	-20 ~-40	200/230, 50/60	1/2		
DF9010		236	-86	-60~ -80		1/2×2ea		
DF4514	392	230	-45	-20 ~-40	200/230, 50/60	1/2		
DF9014		261	-86	-60~ -80		1/2×2ea		
DF4517	492	255	-45	-20 ~-40	200/230, 50/60	1/2		
DF9017		286	-86	-60~ -80		1/2×2ea		
DF4520	593	285	-45	-20 ~-40	200/230, 50/60	1		
DF9020		311	-86	-60~ -80		1×2ea		

2.3 Upright Model Specifications

Model No.	Capacity (L)	Weight (Kg)	Lowest Temp. °C	Usage Temp. °C	Electrical (V, Hz)	Electical (Hp)	Insulation	Const-rution
DF3510	276	265	-45	-20 ~-40	200/230, 50/60	1/2	Foamed In place Poly urethane	Textured steel or stainless steel (optional)
DF8510		294	-86	-60 ~-80		1/2×2ea		
DF3514	369	305	-45	-20 ~-40	200/230, 50/60	1/2		
DF8514		334	-86	-60 ~-80		1/2×2ea		
DF3517	484	350	-45	-20 ~-40	200/230, 50/60	1/2		
DF8517		380	-86	-60 ~-80		1/2×2ea		
DF3520	605	380	-45	-20 ~-40	200/230, 50/60	1/2		
DF8520		410	-86	-60 ~-80		1×2ea		
DF3524	730	420	-45	-20 ~-40	200/230, 50/60	1		
DF8524		450	-86	-60 ~-80		1×2ea		

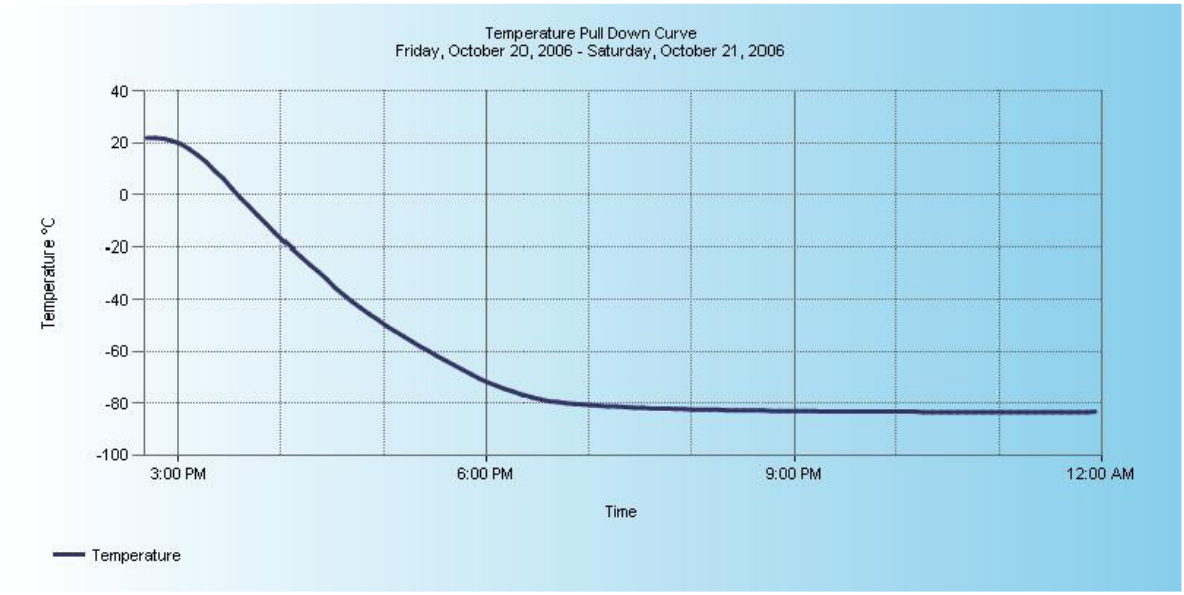
***General Remarks Usage Temperature:**

We recommend to run the ilShin Freezers DF85** and DF90** Series with a setpoint of -80°C. Our freezers are produced, tested and calibrated on this temperature setpoint. With this setpoint the freezer is performing in most optimal conditions and guarantees the longest lifetime for compressors. In case of using set points with colder temperature will decreases compressor lifetime and does not have any affect on better conditions for your samples. For DF35** and DF45** Series we recommend a setpoint of –40°C

2.4 Characteristics of Temperature DF85** Series

Pull down curve for DF8514 (for testing cooling speed)

Model: DF8514



Testing environment:
Ambient temperature: +25°C (+/- 2 °C)
Empty freezer

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Wireless Lab®
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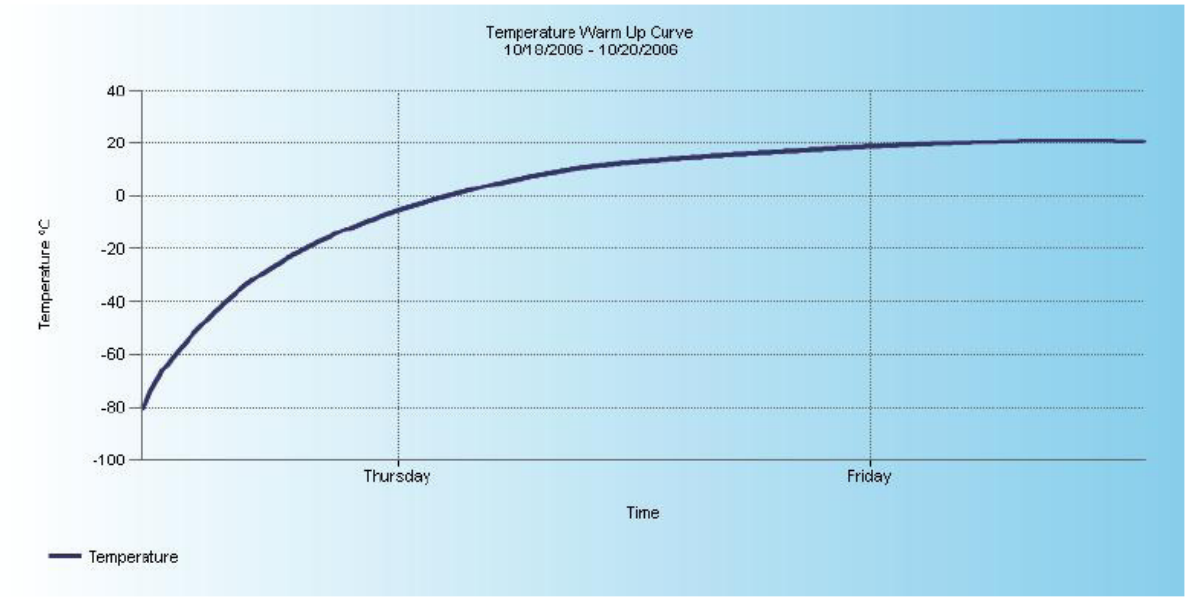
Warm up curve for DF8510 (for testing isolation rate)

Model: DF8510



Testing environment:
Ambient temperature: +25°C (+/- 2 °C)
Empty freezer

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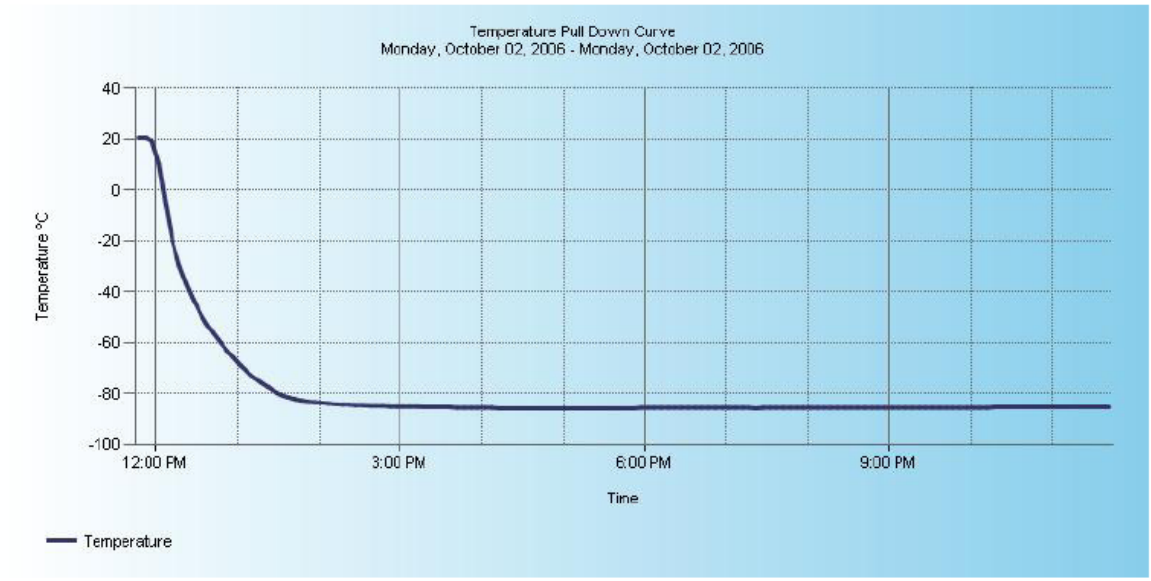
2.5 Characteristics of Temperature DF90** Series

Pull down curve for DF9010 (for testing cooling speed)

Model: DF9010



Testing environment:
Ambient temperature: +25°C (+/- 2 °C)
Empty freezer

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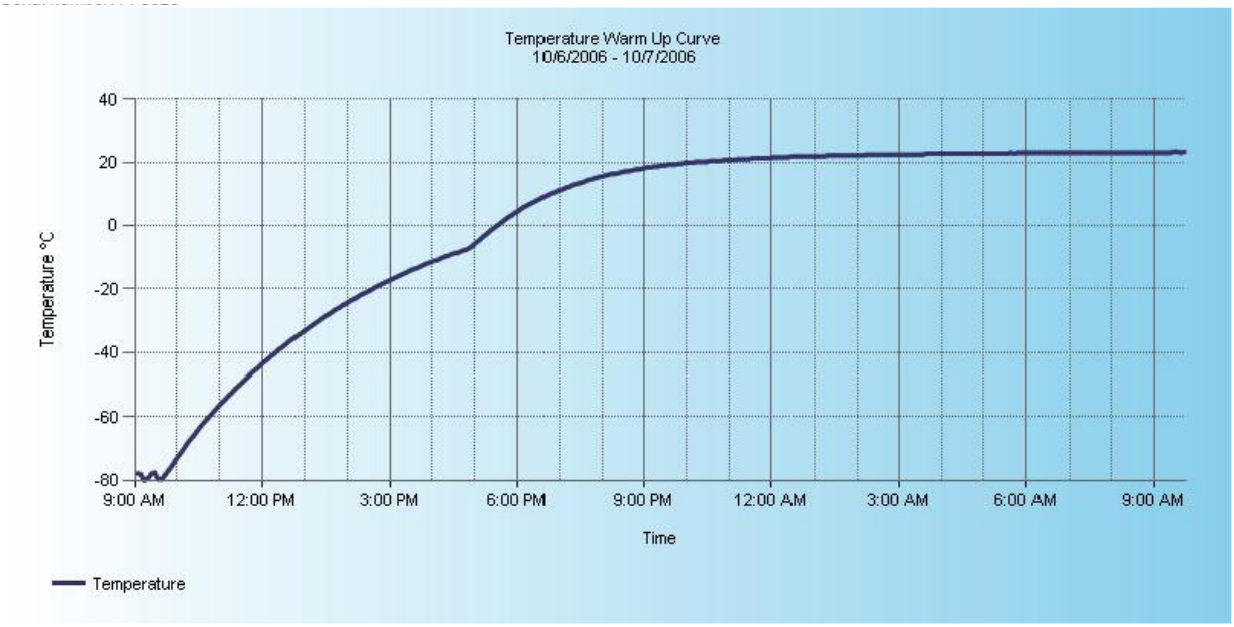
Warm up curve for DF9010 (for testing isolation rate)

Model: DF9010



Testing environment:
Ambient temperature: +25°C (+/- 2 °C)
Empty freezer

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3. Installation

3.1 Installation Place

1. Do not subject to direct sunlight
2. Adequate air circulation
3. Not subject to excessive dust
4. Not subject to mechanical vibration or shock
5. Operating temperature: 5°C to 3°C, Recommended performance conditions are ambient of 18 – 2°C
6. Operating Height: below 2,000 m
7. Operating moisture: below 80%(in case that the max. operating temperature is 33°C , it should be below 57%)
8. Allowance of supplying voltage change: lower than 10%

*In case you install the unit other places than mentioned above, the unit cannot operate properly.

3.2 How to Install

1. Keep the distance between the wall and the backside of the unit 15cm or more (please use the standard supplied distance pins)
2. Do not install the unit in an uneven position.
3. Make the unit fixed with fixing screws on the sleepy floor.
4. The ventilation should not be obstructed.

4. Power supply, power switch & external connections,

4.1 Power Supply

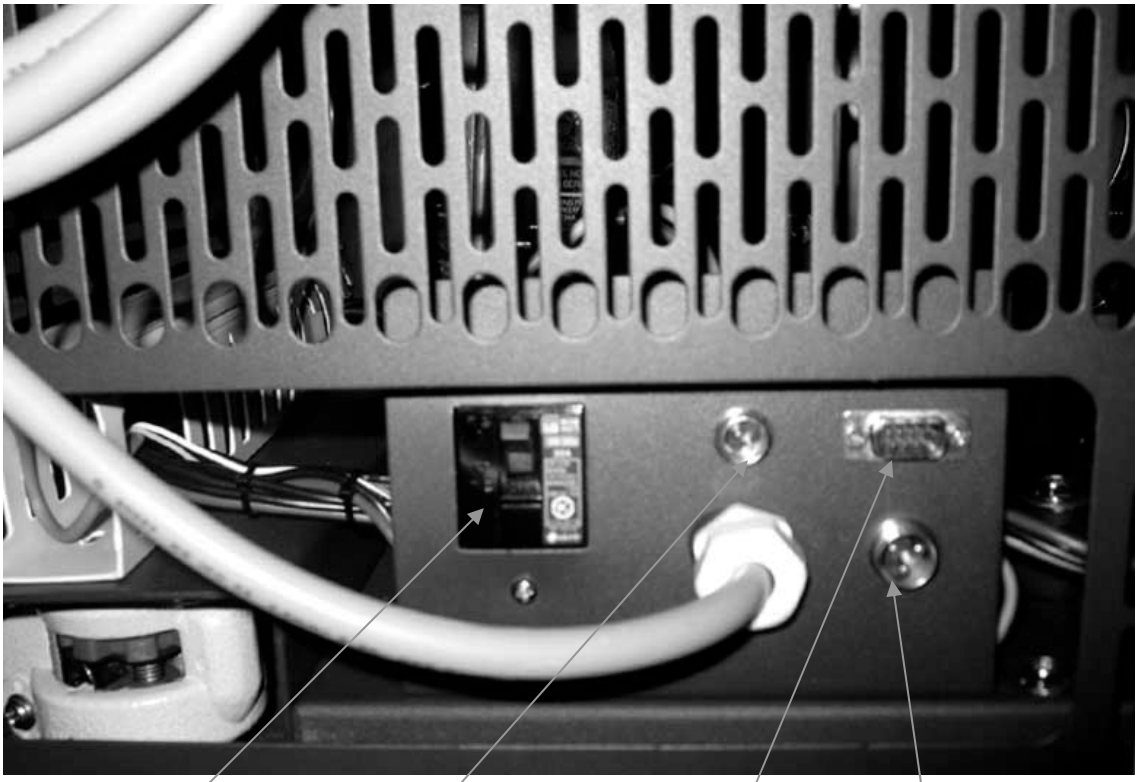
1. To ensure trouble-free connection, connect the plug firmly in the power socket.
2. Don’t connect the plug of the unit together with plug of other units in the same socket.
3. Make sure that the power supplying cord is not folded and pressed.
4. If you use an extension wire, it should has capacity above 250V, 15A and not longer than 3m.
5. This unit is exclusively designed for 208-230V, 50Hz, please check the operating voltage, before use.

   * Under 110V, transmitter for elevating voltage (above 3Kw) should be used.

4.2 How to Earth

1. For security reasons, the unit should be earthed.
2. If the power socket is fitted with earth rod(230V), please check the outlet for earth, before use.
3. In case the power socket is **not** fitted with earth rod(230 V), please contact your local ilShin supplier.

4.3 Main Power Switch



The main power switch is located at the back of the freezer. After power supply is checked and the unit is earthed, open de condenser door. By switching the main power switch in ON position the Freezer will use the power and on this time is ready for operation

* If the freezer is not in use: please put the main switch in OFF position

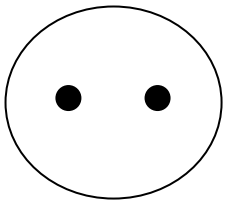
4.4 Door Alarm

The door alarm can be used in combination with the CO2 backup system. It is a safety feature to make sure the operator does not get into contact with liquid CO2 / LN2 in case of opening the door of the freezer. Always connect the CO2 / LN2 backup system to the door alarm connection at the back of the freezer.

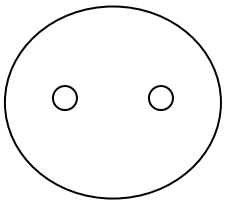
*For safety measure resistance on the contacts with Ohm metre

1. Do contact 1 & 2 show resistance?

Connection should be a closed loop



(normal conditions, closed loop



(door open conditions, open loop)

2. Open door / lid

3. Do contact 1 & 2 show unlimited resistance?

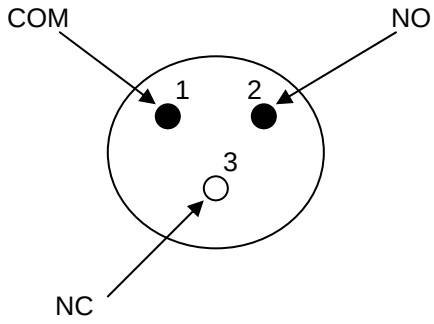
Connection should be a open loop

4.5 Remote Alarm

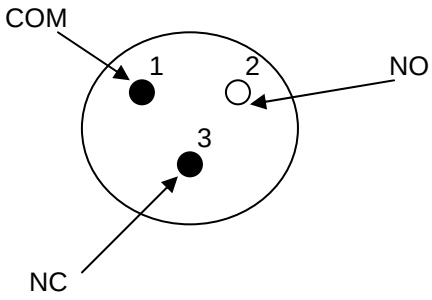
The remote alarm is a volt free dry contact which will alarm in case of:

1. High temperature alarm;
2. Low temperature alarm;
3. Power failure;
4. Clean filter alarm.

Male and female alarm plug #1019



Alarm Conditions



Normal Conditions

In normal conditions relay is always closed which means connection between COM and NC (normally closed). In case of alarm relay is open and means connection between COM and NO (normally open)

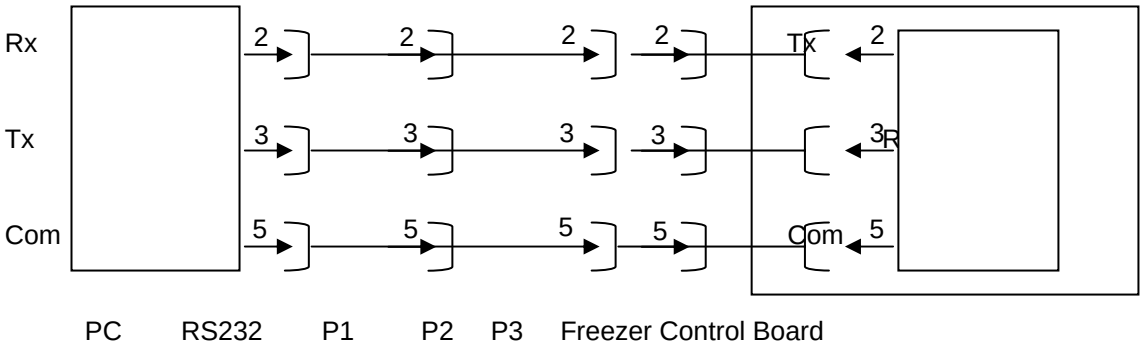
4.6 RS232C Port

The RS232C Port can be used to monitor temperature and alarms on your PC by using the ilShin software and a RS232 cable. This software can monitor:

1. Actual Temperature
2. Temperature Setpoint
3. High Temperature alarm setpoint
4. Low Temperature alarm setpoint
5. High alarm
6. Low alarm

These parameters can be logged also on your computer. More information about the Software installation is described in paragraph 6.2

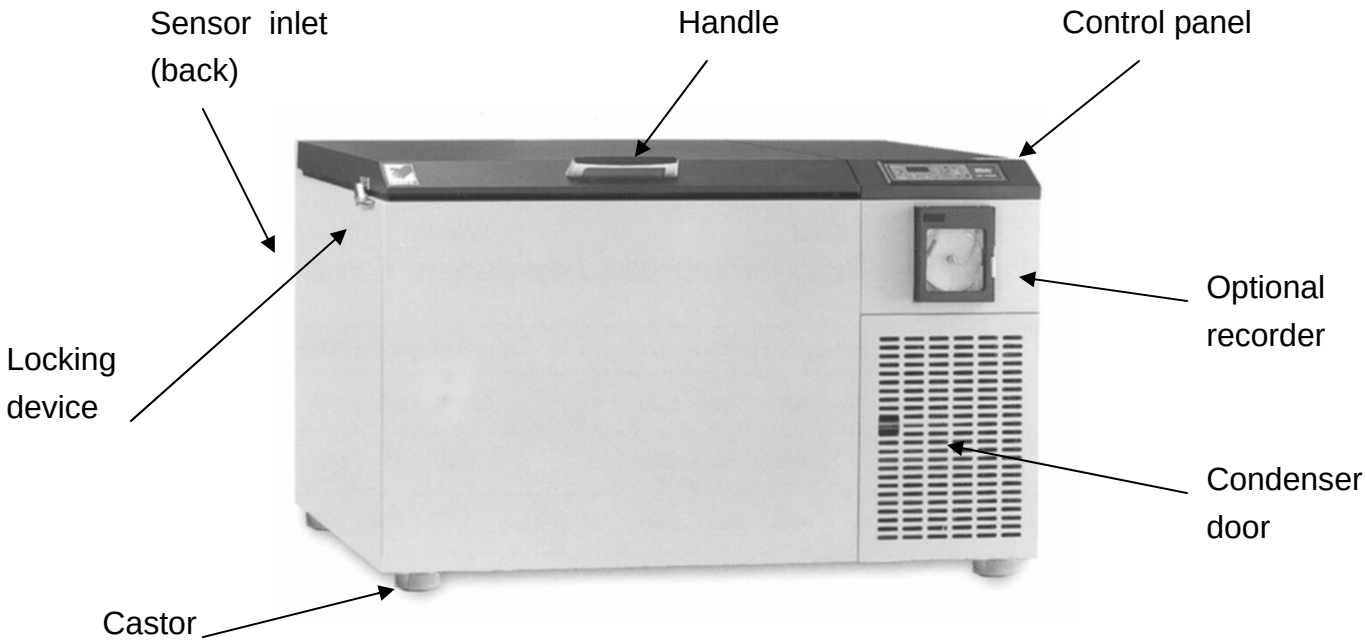
* The diagram below illustrates the wiring between the RS-232C port of the computer and the Deep freezer.



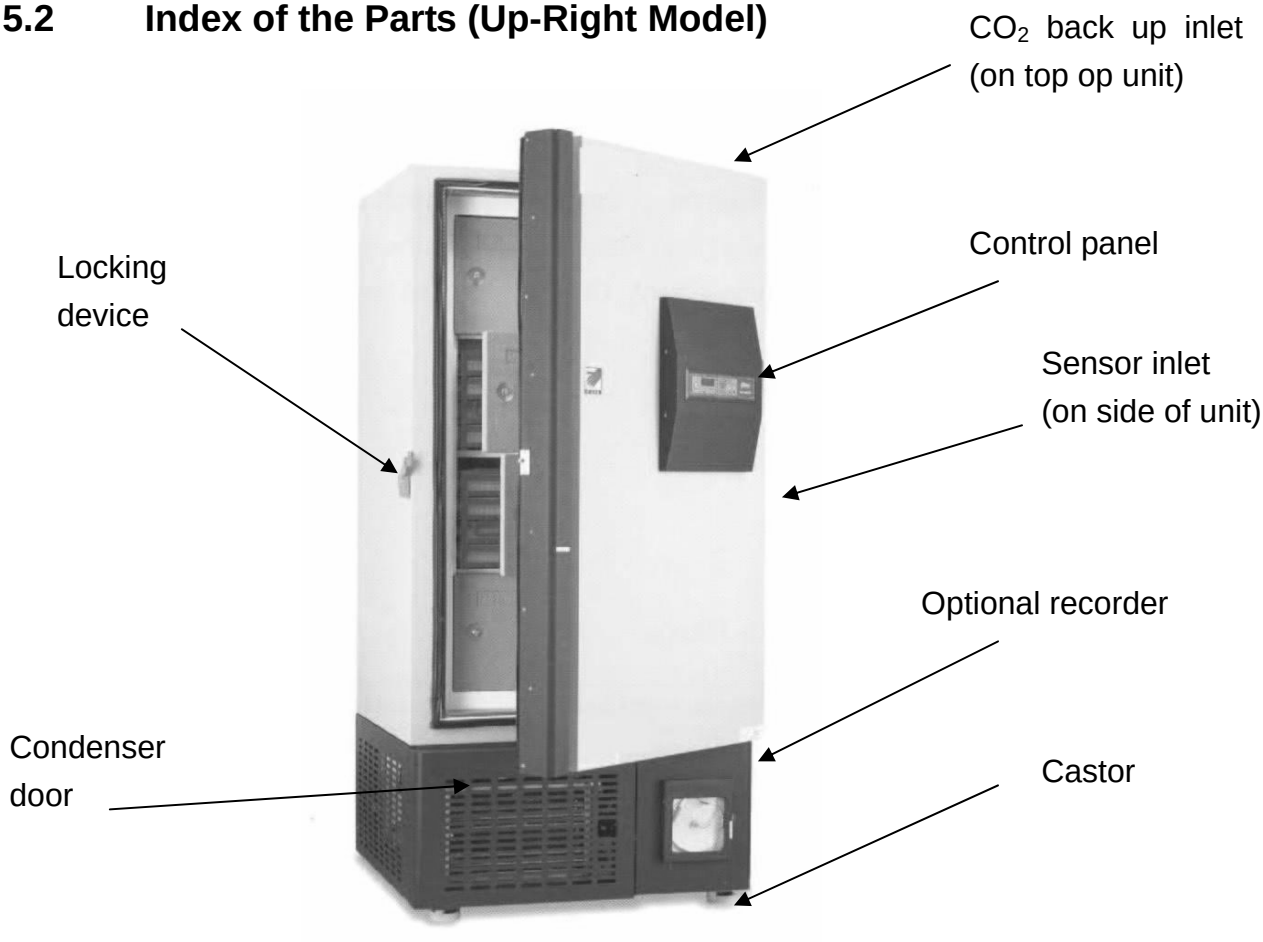
Connection Cable Assembly 100m max.

5. Index of parts and functions

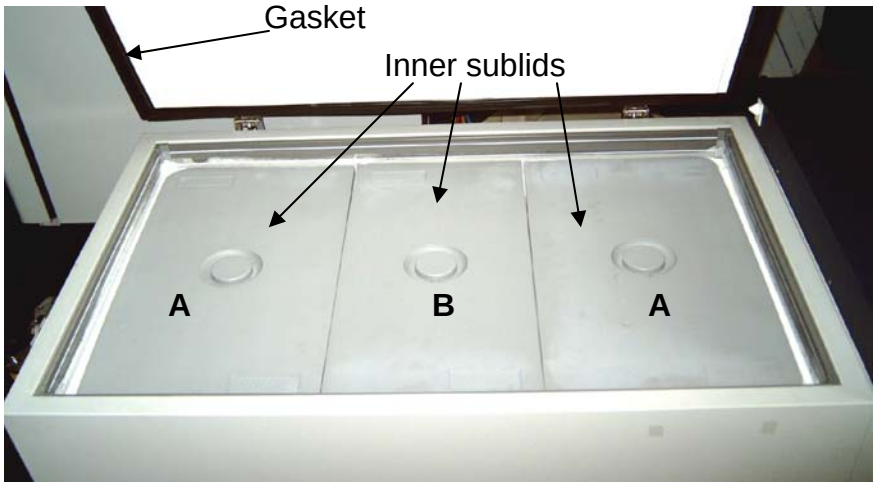
5.1 Index of the Parts (Chest Model)



5.2 Index of the Parts (Up-Right Model)

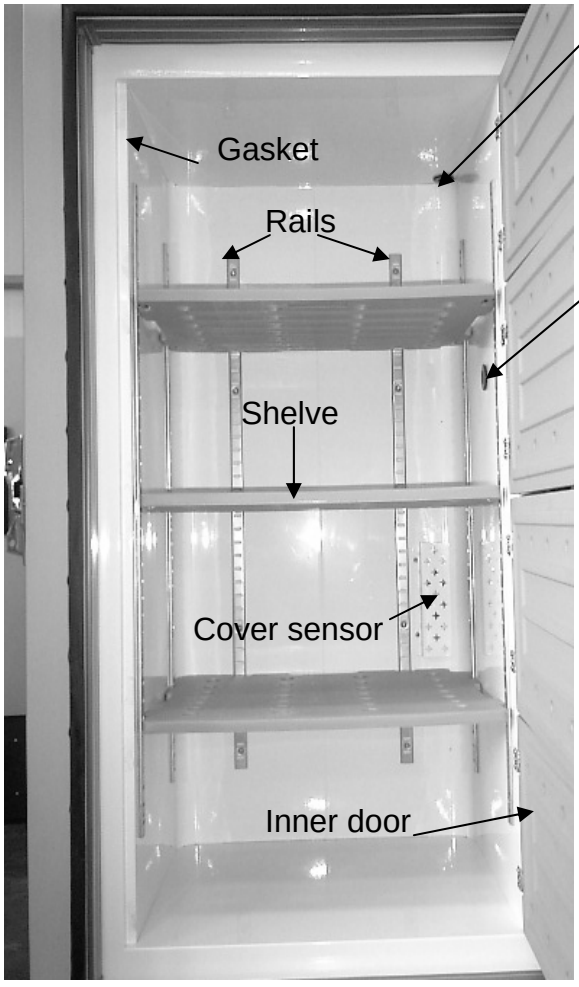


5.3 Index of Inner Sublids for Chest Models



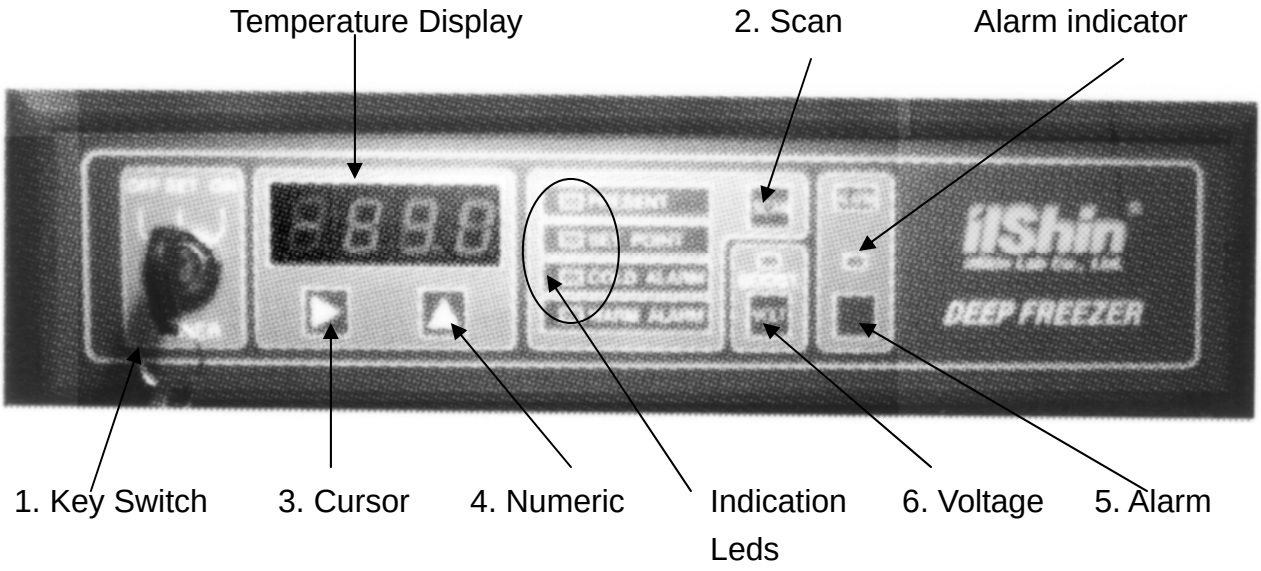
Type	A	B	Model				
			DF9007 DF4507	DF9010 DF4510	DF9014 DF4514	DF9017 DF4517	DF9020 DF4520
Size(mm)	345×620×18	300×620×18	Ax2	Ax2 Bx1	Ax2 Bx2	Ax2 Bx3	Ax2 Bx4

5.4 Index of Inner Compartment Shelves for Upright Models



Model	Number	Size(mm) (W)×(D)×(H)
DF35,8510	2	595×470×18
DF35,8514	3	595×470×18
DF35,8517	3	595×620×18
DF35,8520	3	745×620×18
DF35,8524	3	745×728×18

5.5 Index of Control Panel and Functions



NO.	BUTTON	CONTROLS
1.	KEY SWITCH	-During OFF, all functions are stopped -During SET, all functions are working, and it is possible to adjust the temperature -During ON, the unit is operating as planned, and it is not possible to adjust the temperature. *Function blocking system: If you take out the key during ON, all functions will be blocked (Please keep the key well, for the planning of functions)
2.	SCAN	-This button is to select each temperature mode (Only in the case that the KEY SWITCH is set to SET)
3.	CURSOR	-This button is to select a position of numerical value
4.	NUMERIC	-This button is to change a numerical value
5.	ALARM	-If the inside temperature of the unit exceeds the alarming temperature range, an error message will be shown on the temperature indicator. The lamp will be on and the alarm signal will sound. (Push the alarm button (mute), then, the alarm signal does not sound)
6.	VOLTAGE	-This button indicates the voltage (Push the button, then the voltage will be shown on the Temperature indicator)

5.6 How to Operate

1. Turn the KEY SWITCH to the right and set it to SET.
2. All functions will be operational. The PRESENT led will light and the current inside temperature of the Chamber will be shown on the display.
3. Push the SCAN button once to check the current setpoint.
   =>The SET POINT led will light.

(To adjust SET POINT, use the CURSOR button and NUMERIC button)

4. Push the SCAN button once more to check low alarm setpoint.
   =>The COLD ALARM led will light.

(To adjust the COLD ALARM, use the CURSOR button and NUMERIC button)

** The COLD ALARM should be set lower than the SET POINT temperature*

e.g. In the case that the SET POINT is –70 ℃ , the COLD ALARM is –75 ℃ .

5. Push the SCAN button once more to check the high alarm setpoint.
   =>The WARM ALARM led will light

(To adjust the WARM ALARM, use the CURSOR button and NUMERIC button)

** The WARM ALARM should be set higher than the SET POINT temperature*

e.g. In the case that the SET POINT is –70 ℃ , the WARM ALARM is –65 ℃ .

6. Push the SCAN button once more to turn on the PRESENT lamp showing the current inside temperature of the deep freezer again.
7. Now, everything is set. Turn the KEY SWITCH to the right once more to ON. Take out the KEY by pulling it to the front. Please keep the KEY carefully in order to change temperature setpointsin the future.

(As long as the key is taken out, it is impossible to change setpoints. It prevents changing setpoints byunauthorised people or by mistake. In this way, thesamples storedare protected).

8. To check the voltage, push the VOLT button.
   =>The current incoming voltage will be shown.

Standard every ilShin is equiped with voltage compensation in order to protect the compressor system. In case the input voltage is lower than 180V, the operation of the unit will be stopped to protect the vital parts of the unit. The alarm functions and temperature indication are still operating.

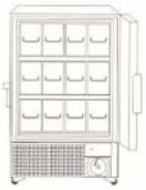
Factory Installed and Recommended Setpoints:

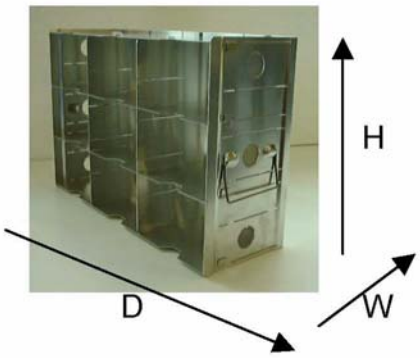
DF90** Series DF85** Series	**SET POINT** -80 °C **COLD ALARM** -90 °C **WARM ALARM** -70 °C	DF45** Series DF35** Series	**SET POINT** -40 °C **COLD ALARM** -50 °C **WARM ALARM** -30 °C

** There can be differences in the standard temperature of SET POINT, COLD ALARM, AND WARM ALARM depending on the model*

6. Accessories

6.1 Aluminium Storage Racks for Upright Freezers

Model:	DF8510	DF8514	DF8517	DF8520	DF8524
Amount of racks: (view from afront)	 12 racks	16 racks	16 racks	20 racks	20 racks
Type of racks for 2 inch boxes:	3 deep, 5 high Part: UR0066	3 deep, 5 high Part: UR0066	4 deep, 5 high Part : UR0068	4 deep, 5 high Part : UR0068	5 deep, 5 high Part : UR0070
Type of racks for 3 inch boxes:	3 deep, 3 high Part: UR0067	3 deep, 3 high Part: UR0067	4 deep, 3 high Part : UR0069	4 deep, 3 high Part : UR0069	5 deep, 3 high Part : UR0071
Max.of 2 inch:	180 boxes	240 boxes	320 boxes	400 boxes	500 boxes
Max. of 3 inch:	108 boxes	144 boxes	192 boxes	240 boxes	300 boxes



External Rack Dimensions: (mm D x W x H)	425x145x283	425x145x283	558x145x283	558x145x283	692x145x283

Internal Rack Dimensions (mm D x W x H)

For 2 inch boxes, each opening: 145 x 136 x 51

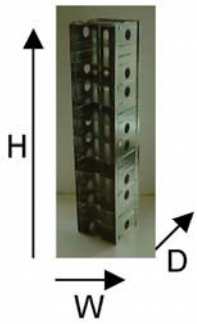
For 3 inch boxes, each opening: 145 x 136 x 88

6.2 Aluminum Storage Racks for Chest Freezers

ilShin® Europe

Storage Racks for Chest Freezers

Model:	DF9007	DF9010	DF9014	DF9017	DF9020
Amount of racks: (view from above)	12 racks	18 racks	24 racks	30 racks	36 racks
Type of racks for 2 inch boxes:	12 high Part: CR0062	12 high Part: CR0062	12 high Part: CR0062	12 high Part: CR0062	12 high Part: CR0062
Type of racks for 3 inch boxes:	8 high Part: CR0063	8 high Part: CR0063	8 high Part: CR0063	8 high Part: CR0063	8 high Part: CR0063
Max. of 2 inch:	144 boxes	216 boxes	288 boxes	360 boxes	432 boxes
Max. of 3 inch:	96 boxes	144 boxes	192 boxes	240 boxes	288 boxes



External Rack Dimensions: (mm D x W x H)	146x146x660	146x146x660	146x146x660	146x146x660	146x146x660

Internal Rack Dimensions (mm D x W x H)

For 2 inch boxes, each opening: 145 x 138 x 51

For 3 inch boxes, each opening: 145 x 138 x 78

6.3 Fiberboard Storage Boxes and Dividers

Easy to remove cover

Thick Plastified Cardbox Material

External dimensions:

External dimensions of 2 inch boxes (model PP0060): 133x133x49 mm (DxWxH)
External dimensions of 3 inch boxes (model PP0061): 133x133x77 mm (DxWxH)

Internal Dimensions:

Internal dimensions of 2 inch boxes (model PP0060): 124x124x45 mm (DxWxH)
Internal dimensions of 3 inch boxes (model PP0060): 124x124x70 mm (DxWxH)

Possible dividers:

Dividers are also made of plastified cardbox. Height of all dividers is 35 mm

Model:	Description:
PP1049	Storage box divider 7 x 7
PP1064	Storage box divider 8 x 8
PP1081	Storage box divider 9 x 9
PP1100	Storage box divider 10 x 10

6.4 CO_2 Back Up System (optional)

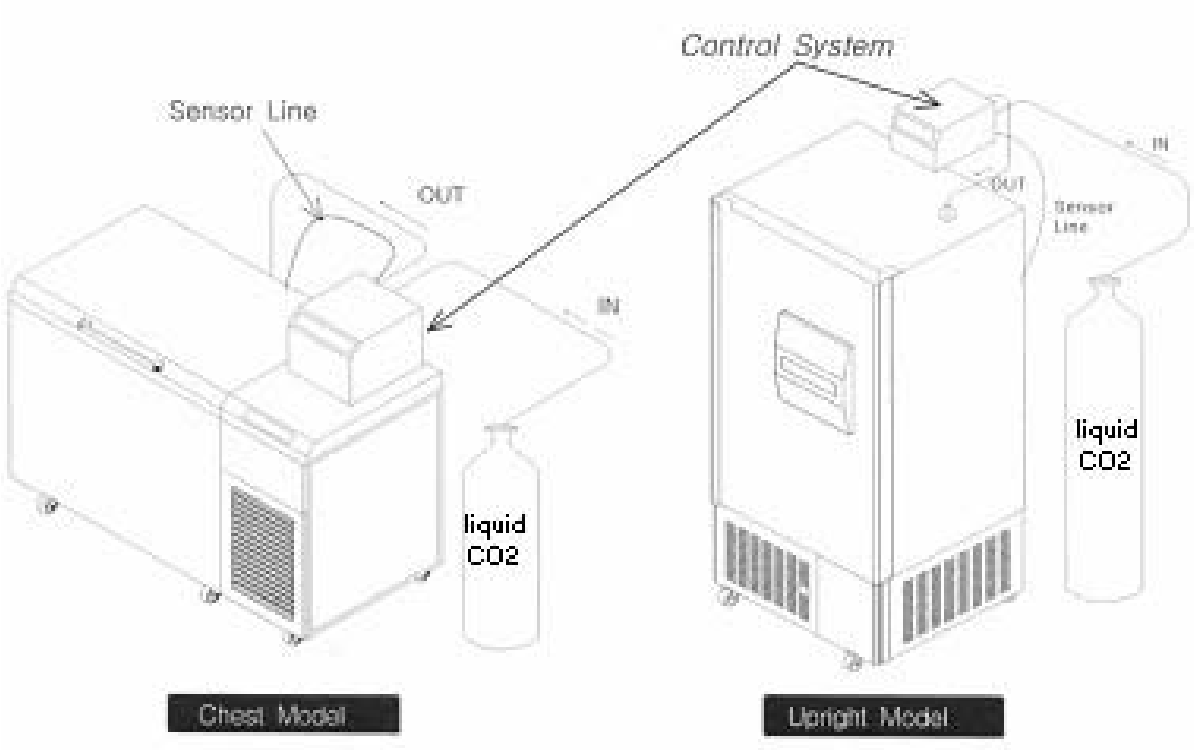
6.4.1 Introduction of CO_2 Backup System (model LC0070)

A CO_2 Backup System ensures an extra safe environment for your samples even in case the Freezer has a long term power failure or in case the freezer has a technical problem. The backup system in combination with a liquid CO_2 bottle / cylinder can remain a temperature around -70 °C for several hours.

For example (for reference only):
- CO_2 bottle / cylinder with 50 litres
- Ambient of 20 °C
- Freezer capacity of 282 litres ½ loaded with products

Temperature inside the cabinet will be stabile on -70°C for approximately 18 hours.

6.4.2 Index of the parts



Check if following items are present:

a

In case the system is ordered together with an ilShin Freezer, following parts are already fitted to the freezer:

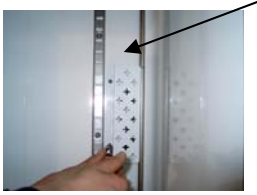
Part b, part e , part h and part e

Also some holes are already drilled

a. CO_2 Back up system;
b. Injection tube with holes (straight one is used in case of Up-Right freezer, bended one is used in case of Chest freezers);
c. Connection cable for door switch;
d. Black flexible hose;
e. Capillairy tubing;
f. Copper insulated hose;
g. 21/8 connection for CO_2 cillinder **(including teflon ring for tight fitting!);**
h. kit / lute for sealing up holes
i. Connection screws (2x)

6.4.3 How to install the CO_2 Backup System

1. Remove the black stoppers on the back side and top of the freezer. (in case of a chest freezer both stoppers are on the back side);
2. Remove the protection panel covering the temperature sensor inside the freezer;
3. Drill a hole of 13 mm in the stopper which is located on top of the freezer and which was removed in step 3;
4. Drill one hole of 10 mm in the stopper which is located on the back of the freezer and which was removed in step 3;



5. Insert the injection (b) tube into the freezer;
6. Connect the injection tube (b) to the inner wall of the freezer with the two connection screws (i) (holes are factory drilled;
7. Seal/insulate the stopper hole with kit.(h);

8. Connect the door switch cable (c) between the back up system (a) and the connection on the back of the freezer;
9. Put the sensor of the CO_2 Backup System through the 10 mm hole of the stopper which was removed in step 3;
10. Seal/insulate the stopper hole with kit.(h);
11. Insert this sensor into the freezer using the throughput on the back of freezer;

12. Click this sensor in the free clip and re-install the protection panel to cover the temperature sensors;
13. Connect the capillary tubing (e) to the injection tube (b);
14. Connect the black flexible hose (d) to the capillary tubing (e);
15. Connect the black flexible hose (d) to the OUT (5) of the CO_2 back up system (a);
16. Connect copper insulated hose(f) to IN(4)of the CO_2 back up system (a);
17. Connect the connection for CO_2 cylinder(g) to the CO_2 cylinder;

    Do not forget to use the Teflon ring for well fitting!
18. Connect the copper insulated hose (f) to the connection for CO_2 cylinder(g);
19. Open the valve on top of the **liquid** CO_2 cylinder (never use CO_2 gas);
20. Test the connections on leakages (with soap water);
21. Set the set-point of the CO_2 back up system on – 55 ºC;
22. Always put the high alarm of the freezer on a colder set-point (– 65 ºC) ;
23. Switch on the BATTERY SWITCH on the back of the system;
24. Switch the ALARM SWITCH on, to activate the alarm signal.

WARNING: PLEASE DO NOT TURN ON THE CO2 BACK UP SYSTEM FOR THE *FIRST* TIME BEFORE THE UNIT HAS REACH THE TEMPERATURE OF -80C.

If the CO2 Back up system is turned on before the unit is cold (-80C) the back up system will start injecting CO2 because it has not reached the right temperature yet.

6.4.4 How to set the temperature of the CO_2 back up system

How to set temperature	Remarks
- Push (1) SET SWITCH -To change the set temperature hold the the button (1) SET SWITCH and use a small screw dryer to turn the (3) TEMP.ADJ. to the left and right to set the temperature. -Release the SET SWITCH at the chosen temperature. The PRESENT led will ight and the current temperature of the chamber will be shown. -The temperature is standard factory set to -60ºC.	- In case the temperature goes up, because of a power failure or technical problem, the temperature set to the BACK UP SYSTEM, will be observed. Thus, the damage on the sample in the unit can be limited to a minimum.

6.4.5 CO_2 Backup System Safety Remarks

** The BATTERY SWITCH should be OFF during moving, storage, or POWER OFF. (When the BATTERY SWITCH is on for a long time with power OFF, the battery will be discharged and should be replaced);*

** When you replace the used CO_2 cylinder, please, use the CO_2 cylinder with Siphon Tube, not general CO_2 cylinder;*

** When the door is open during injection of CO2, the injection should be stopped automatically to protect the user;*

For safety for our **Upright Freezers we recommend to use our CO_2 backup system always in combination with our heated equalization valve to prevent over-pressure in the cabinet. To check this freezer has a heated pressure equalization valve, please check inside of the door for the pictured valve;*

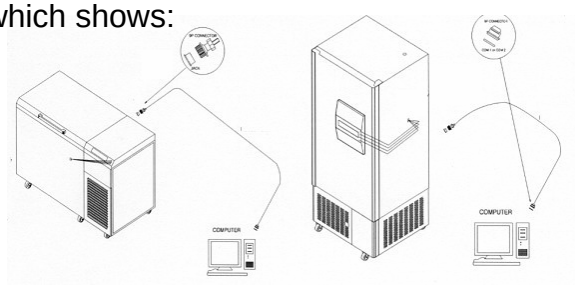
For safety for our **Chest Freezers we recommend to use our CO_2 backup system always in combination with a basic equalization valve to prevent over-pressure. To check this freezer has a basic equalization valve, please check backside of the chest for the pictured valve.*

** For safety for our **Upright Freezers** we recommend to use our 1004C Large Door Handle with Integrated Lock to prevent pressure breaking off standard door handle.*

6.5 Data Acquisition System (Optional)

This Software dispays a monitoring panel, which shows:

- Present Temperature
- SetPoint
- Warm Alarm Limit
- Cold Alarm Limit



6.5.1 Hardware setup

1. Connect the 9 Pins connector of RS232 cable to the COM1 or COM2.
2. Connect the 9 Pins of RS232 cable to the Jack of rear side of the freezer.

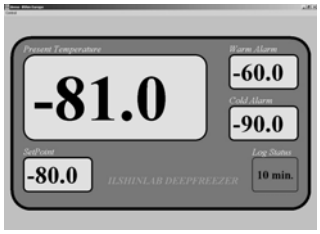
(more technical details about the wiring and location of the RS232C Port is described in paragraph 4.5, RS232C port)

6.5.2 Alarms

Exceeding of alarm limits is shown by a blinking display window of the alarm in question. An audible alarm is given as well.

The alarm condition can be acknowledged with a left mouse click on the blinking window or by hitting the spacebar. The window will stay red (Warm Alarm) or blue (Cold Alarm) as long as the alarm condition exists. The window will keep blinking until the alarm is acknowledged, even when the temperature is returned within normal limits. In this case the blinking colour will be light grey.

Warm alarm



Cold alarm

6.5.3 System Setup

Minimum requirements: 486 PC with W98 installed.

Copy the file “ilshin.exe” in a folder of your own choice and start the program by double clicking on the ilshin icon.

Once the program is started it checks for a connected freezer in operation on either COM1 or COM2. If no freezer is found the program enters a simulation mode.

In case of normal operation a configuration file with user settings is loaded and the values, which are received from the freezer, are displayed. If no configuration file is found, default user settings are loaded.

When during normal operation the freezer is disconnected or turned off, the text “Freezer Off” is displayed, until the normal operation is restored.

6.5.4 User Setup

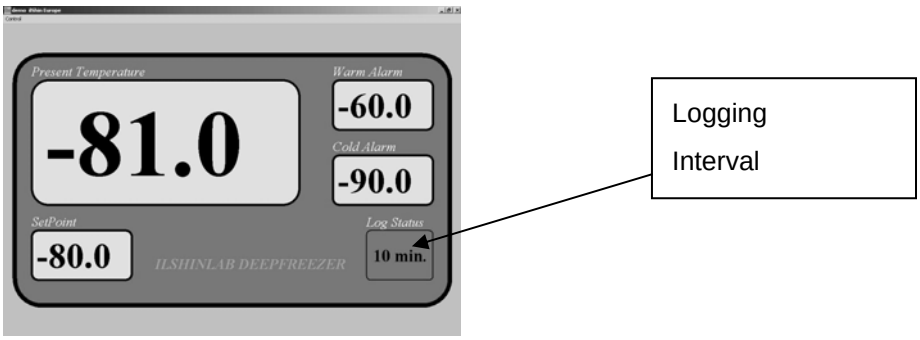
Via the menu Control->User Settings a Dialog Box is opened with the following information:

- UserId.
- UserName.(for instance the location or contents of the freezer)
- Manufacturer TypeNumber.
- Serial Number.
- Logging Interval.
- Pathname to folder on harddisk where the logfile is stored.
  For instance c: or c:\ilshin etc. (So NO ending backslash!).

This information is effected when the button “OK” is checked. When “Close” is checked without checking “OK” before, the user settings remain unchanged.
The user settings are stored in the configuration file on the harddisk when the program terminates.

6.5.5 Temperature Logging

Logging is switched “on” or “off” by checking LogOn or LogOff in the control menu. The logging status or interval is shown in the low right corner.

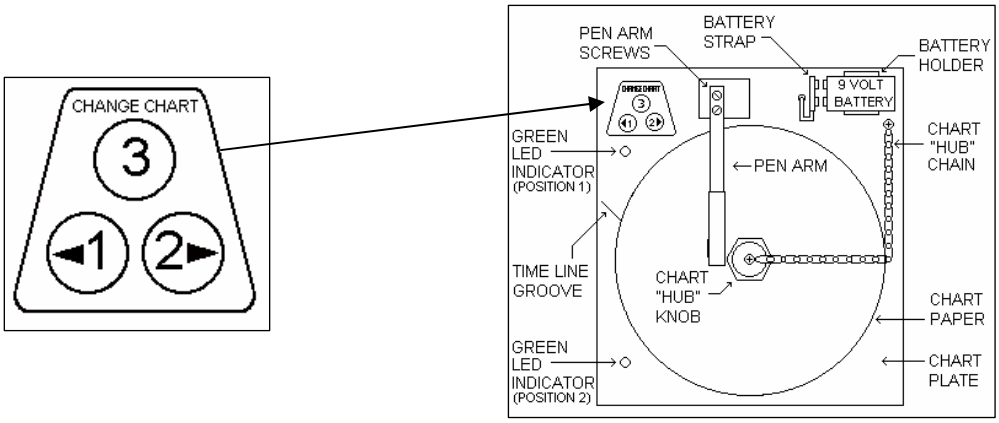


In the User settings dialog box (Control->UserSettings) the log interval can be set from 1 minute to 60 minutes.
The log information is written to a textiles named ‘username’-‘date’.txt in the folder which is specified in the User Settings. If an invalid pathname is specified, the current directory will be used. The format of the logfile is also compatible with an MS Excel worksheet. The used format for the date is “daymonthyear”.(for instance 311203.) On changing of the date at midnight a new log file with the new date in the name is created.

6.6 Chart Recorder (Optional)

6.6.1 Changing the chart paper

Press and hold the "change chart" button (#3) for approximately one (1) second until the pen begins to move to the left of the chart and then release the button. Wait until the pen has moved completely off of the chart. To remove the chart paper, unscrew (counter-clockwise) the chart "hub" knob at the centre of the chart. Remove the old chart paper and position the new one so that the correct time line coincides with the time line groove on the chart plate. Refer to following figure for the location of the time line groove.

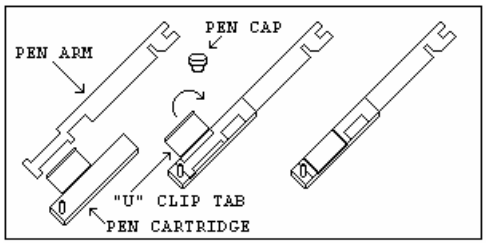


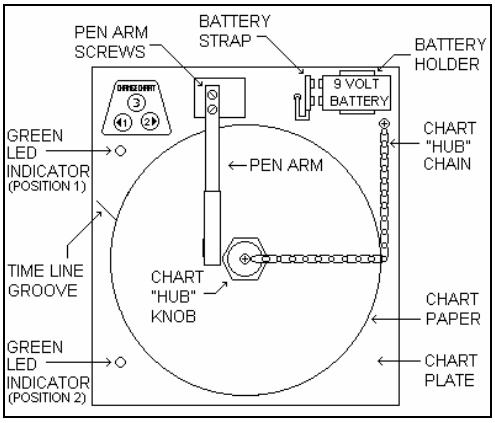
Re-attach the chart "hub" knob and screw securely (by hand) against the chart. Press and hold the "change chart" button (#3) again for approximately one (1) second until the pen begins to move back onto the chart and then release the button. Check to make sure that the pen is marking on the chart paper. If it is not, then carefully adjust the pen arm to establish contact with the paper.

6.6.2 Replacement of pen

Recorders that are equipped with fibre tipped cartridge pens will have a cartridge that is colour coded "red" to designate pen number one (1). The pen cartridge is securely fastened to the metal pen arm using a special "U" clip tab.

For ease of replacement, it is suggested that the two (2) screws that hold the pen arm be loosened and the pen cartridge and metal pen arm be removed as an assembly. Refer to the following figure (next page) for the location of the pen arm screws.





Unsnap the plastic "U" clip tab of the pen cartridge from the metal pen arm, remove and discard the old pen cartridge. Replace the new cartridge by opening the hinge and snapping it securely around the metal pen arm. Refer to the figure above.

6.6.3 Pen arm calibration

To check and/or adjust the recording pen calibration to the outer most temperature graduation of the chart, press and hold the "change chart" button (#3) until the pen begins to move off of the chart. Once the pen has moved off of the chart, again press and hold the "change chart" button (#3) until the pen begins to move back onto the chart. The pen should briefly stop at the outer most temperature graduation of the chart before continuing onto the chart to begin recording. If the pen does not stop exactly at this location on the chart, it can be adjusted or "calibrated" by using the left (#1) or right (#2) arrow buttons

When the pen moves back onto the chart and briefly stops, you will have approximately five (5) seconds in which to adjust the pen's position using the left and right arrow buttons.

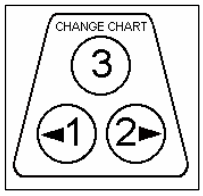
Each time the chart paper or fibre tip pen cartridge is changed, you should make sure that each pen stops at the outer most temperature graduation of the chart paper. Otherwise, this pen *offset* will cause the unit to record an incorrect temperature on the chart.

6.6.4 Temperature recorder calibration check

This recorder has been accurately calibrated at the factory. Before making any adjustments, this instrument should be in service for 24 hours. Thereafter, if any adjustment is required, perform the following procedure:

1. Place a Certified Test Thermometer(s) in a solution bottle(s) alongside the recorder's sensor probe(s).

2. Once the temperature has levelled out, compare the position of the pen on the recorder to the test thermometer's reading.



3. If an adjustment is required, use the left (#1) and right (#2) arrow push buttons on the recorder to calibrate (or move) the pen's position on the chart to correspond to the temperature of the solution. The arrow buttons must be held for approximately five (5) seconds before the pen will begin to move.

6.6.5 Battery backup

The green LED light remains a constant green colour indicating that both the battery and the main power to the unit are good. If the AC power were to fail or the battery becomes weak, then the green LED light will begin "flashing" indicating that either you have lost the main power to the unit or it is time to replace the battery. Having a 9 volt DC battery back-up in place, will allow the recorder to continue to function normally for approximately 24 hours in the event of a power failure.

6.6.6 Battery location and replacement

To replace the battery, first open the recorder door. The battery will be located in the upper right hand corner of the unit.
Note: Use only NEW 9 volt alkaline replacement batteries.

6.6.7 Chart “range” selection

The recorder that you are using has a *range sticker* (that lists several temperature ranges) mounted on the front of the chart plate.

This recording unit has the option for the user to select from several temperature "ranges" that are programmed into the recorder. **Note:** The chart paper that is used on the recording unit must match the *range* that is selected for the recorder. Otherwise, the pen's position on the chart paper will not correspond to the temperature that is measured.

Also, if the pen moves to the centre or outer edge of the chart and remains there while the unit is powered on, then this maybe an indication that the current range that is selected for the unit is not correct. The recorder has a built-in safety mechanism that will always move the pen to the highest temperature on the chart when the current temperature that is measured is not within the selected range.

This recording unit has five (5) user selectable ranges programmed into the unit. To select from one of the available ranges, follow these instructions:

After the recording unit has been powered-on and is operating normally (recording temperature), press and hold the "change chart" button (#3) until the pen arm begins to move off of the chart. Once the pen has moved off of the chart, press and hold the left arrow (#1) or right arrow (#2) button for approximately five (5) seconds and then release the button.

The green LED light will begin flashing one (1) time if range #1 is selected or will flash two (2) times if range #2 is selected and so on. Press the left arrow button (#1) to increase the range number or press the right arrow button (#2) to decrease the range number that is selected for the recorder. When you have finished selecting the range, press and hold the "change chart" button (#3) until the pen begins to move back onto the chart and the selected range will be saved into the recorder's permanent memory.

Note: The correct range for your purchased ilShin is factory set. Changing of chart range is not necessary.

7. Service

7.1 General Troubleshooting

Symptom	Remedy
1. When the room temperature is above + 30 °C - In case the room temperature is above + 30 °C for longer time, the condenser cannot cooled optimal. This can cause high temperature alarm and damage to the compressor system	- If the room temperature around the unit is + 30 °C or warmer, please open the condenser door and the window(s) of the room to optimize the ventilation and cooling. Please note you need an air conditioned room in these circumstances.
2. When the room temperature is below 0 °C - The oil in the compressor will be condensed. It can have negative effect on the operation of the compressor - Some electrical parts will not operate optimal anymore.	- When room temperature is below 0 °C , heat the area/room and keep the temperature minimal + 5 °C
3. In case there is excessive dust around the unit. - This unit uses a condenser which is air cooled. In case of excessive dust around the unit, dust will pile up at the front of the condenser. This will cause the compressor is not cooled effectively and this can cause high temperature alarm and damage to the compressor system	- In case there is excessive dust around the unit open the condenser door once a month and remove and clean dust filter. Also remove dust from the condenser with a soft cloth.
4. In case the condenser door is blocked by an object. - This unit uses a condenser which is air cooled. In case the air circulation / intake is blocked by an object the compressor is not cooled effectively and this can cause high temperature alarm and damage to the compressor system	- Please always make sure the condenser door is kept clear of any object.
5. In case the freezer is installed directly to the wall. - This unit uses a condenser which is air cooled. Warm air should have change to circulate. In case the unit is too close to a wall this freedom is blocked. This will cause the compressor is not cooled effectively and . This can cause high temperature alarm and damage to the compressor system	- Please always make sure the freezer is always at least 15 cm free from all sides.
6.Under heavy humidy circumstances - It can cause a technical malfunction in the electrical applications and short circuit.	- Ventilate the space properly by using a ventilator or by opening the windows - An application, which can reduce moisture, will be helpful.

7.2 Electrical Trouble Shooting

7.2.1 PCB(ISE-120C/D) ERROR CODE

Display Message	Meaning	Situation
ST-E	Setting Error	Setting Value is wrong
LO-T	Low Temp.	Low Temperature Alarm
HI-T	High Temp.	High Temperature Alarm
LO-V	Low Voltage	Line Voltage is low
CLEN	Clean	Clean Filter alarm
BATE	Power failure	Power Failure
LOAD	Over Load	Rise Temperature Over 15°C Fast
+199	+F.S Over (+F.S Over)	Pt Sensor Disconnection
-199	-F.S Over(-F.S Over)	Pt Sensor Short

Error indication

LO-T :Cold Alarm (If the temperature is lower than the Cold Alarm Setpoint). This can happen when very cold samples (Liquid Nitrogen) are placed into the freezer.

HI-T : Warm Alarm (If the temperature is higher than the Warm Alarm Setpoint). This can happen when very warm samples (or many new samples) are placed into the freezer at once. When you put in test samples, please do it in small quantity, and in a short period. The HI-T alarm also sounds in case the door of the freezer was open for some time. Also please check the ambient temperature. When the ambient temperature is above 30°C or the ventilation of the condenser is bad. Please keep the room temperature lower by ventilation or clean the dust in the condenser. Please make sure the Freezer is clear from all sides of the wall.

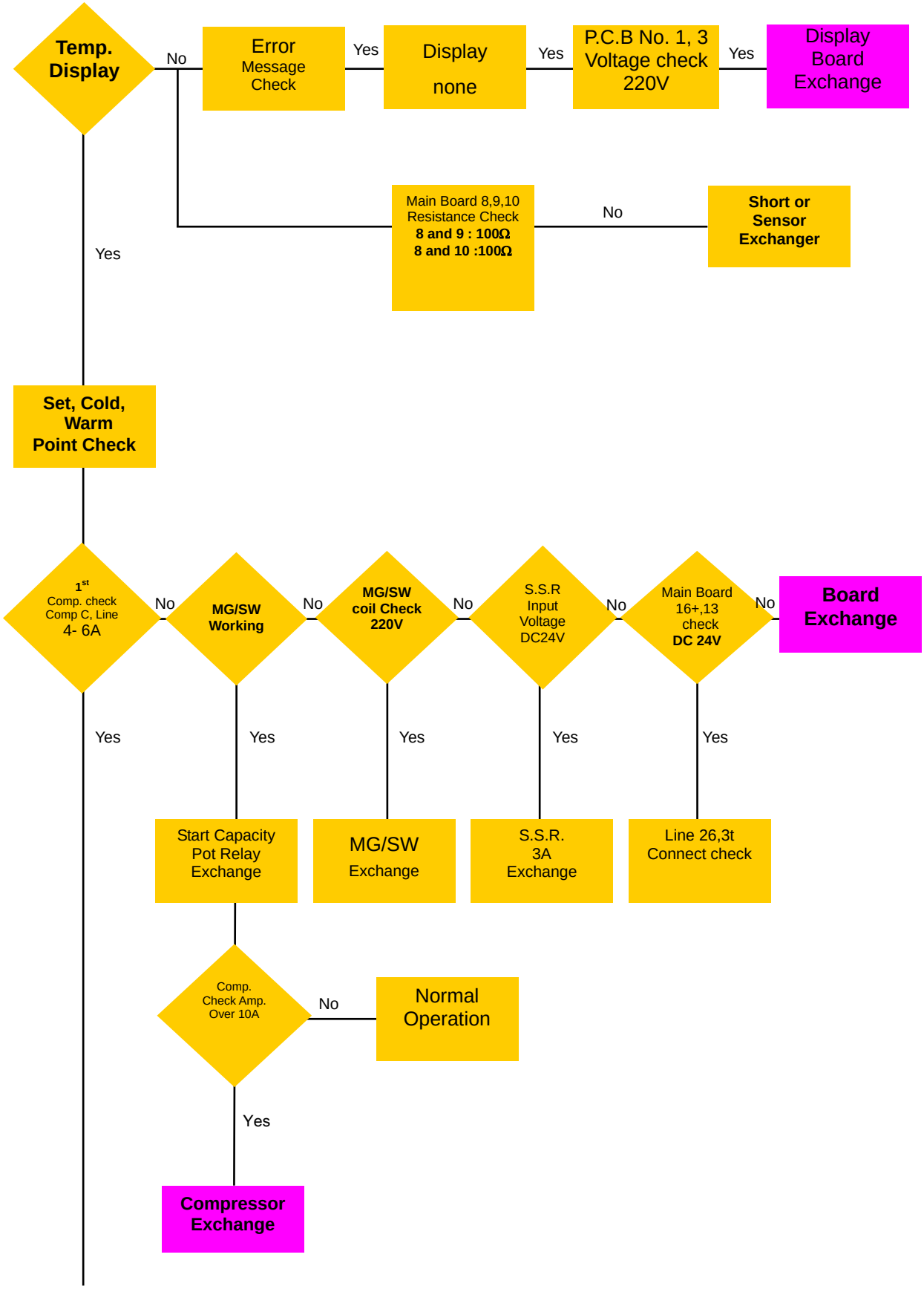
LO-V : Low Voltage (If the input voltage is lower than 205V). Please, don't use other electrical appliances and take some actions to boost the voltage. Maybe the line voltage is OK and the main board needs calibration of voltage.

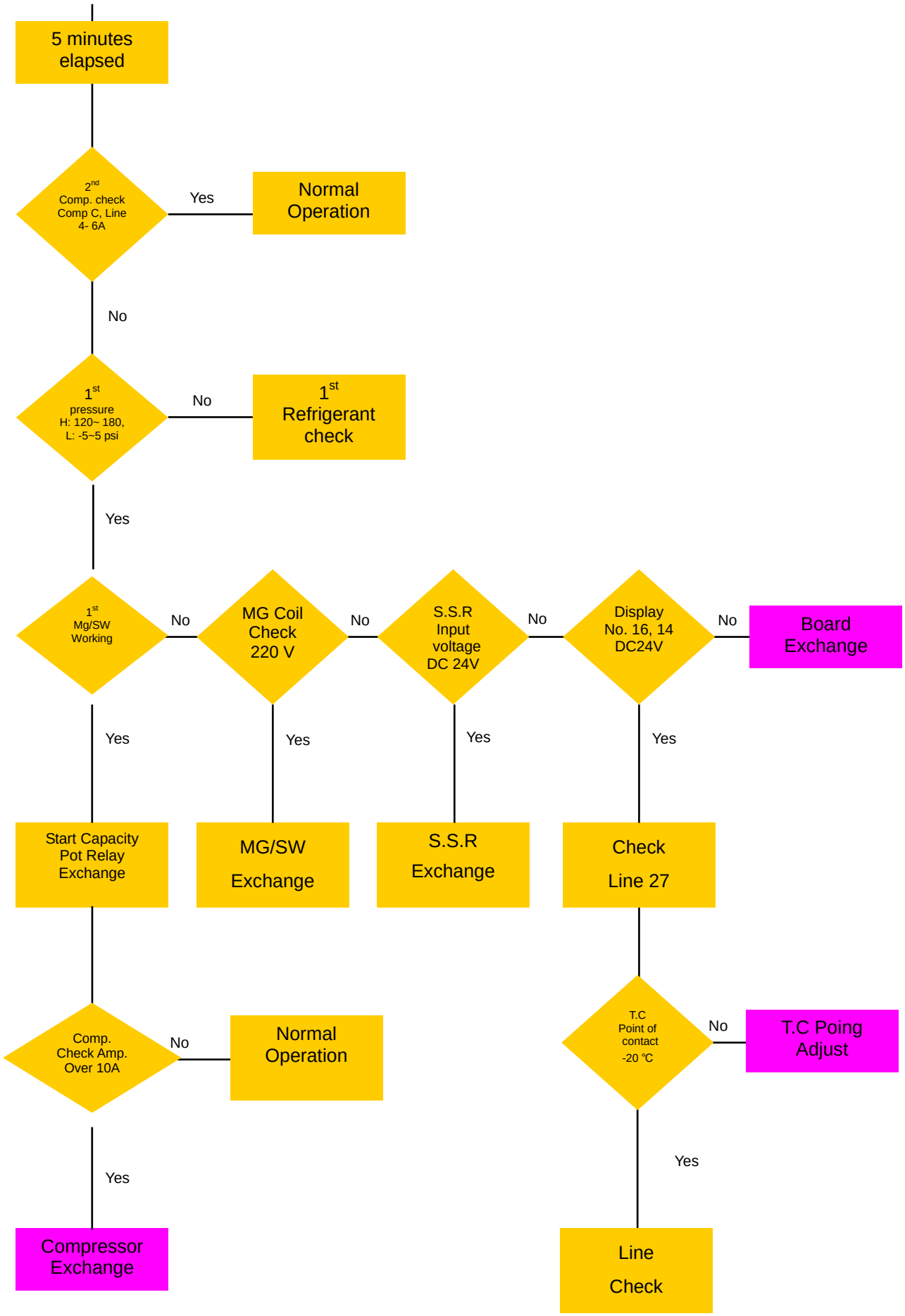
CLEAN : Clean Filter alarm (When the ambient temperature is above 30°C or the ventilation of the condenser is bad). Please keep the room temperature lower by ventilation or clean the dust in the condenser. Please make sure the Freezer is clear from all sides of the wall.

BATE : Operation condition of charging battery (In the case that there is a power failure). If the power failure takes long, please use CO_2 Backup System or move the test sample to a safe place.

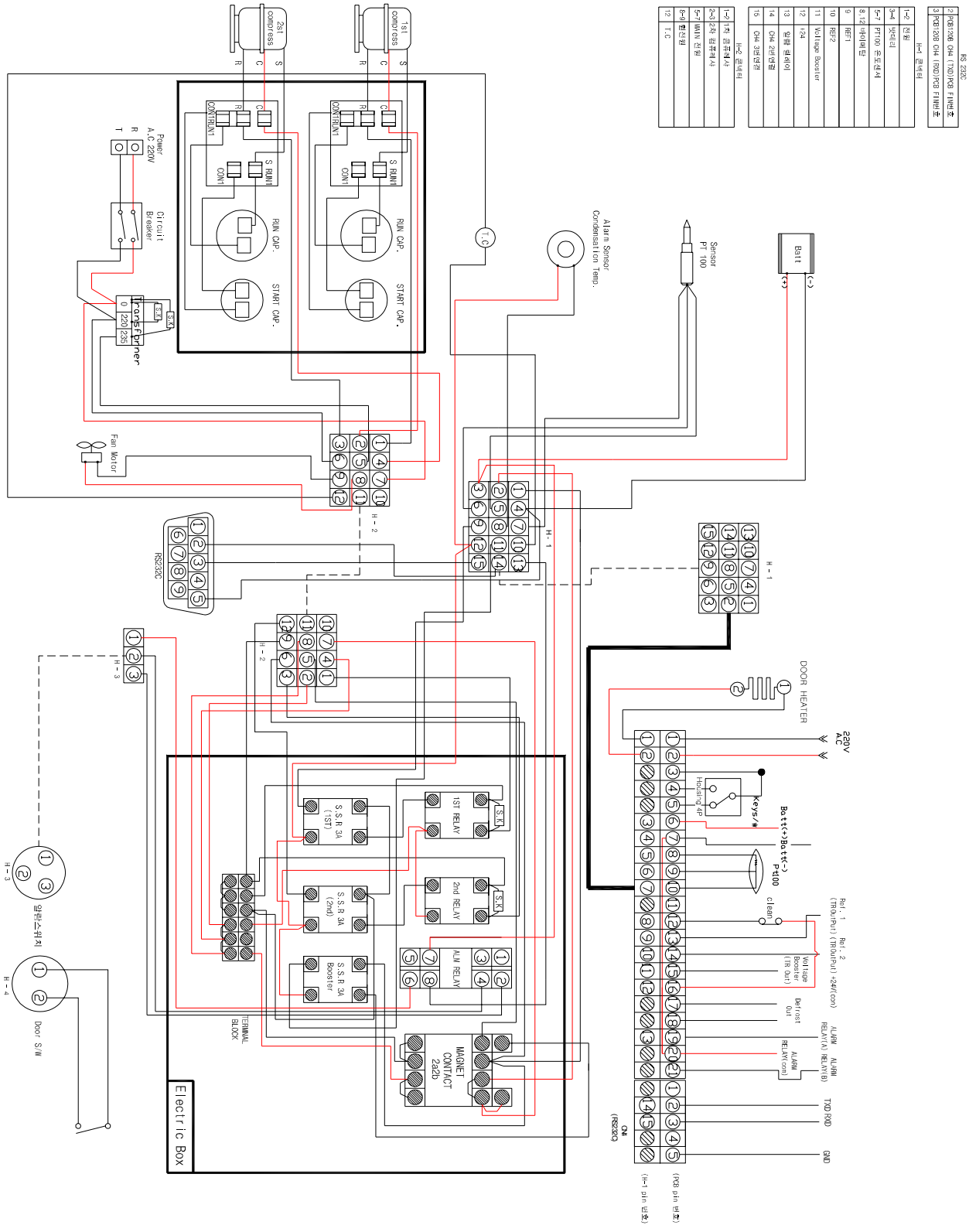
LOAD : Abrupt temperature increasing(In the case that the door of the unit is open for a long time, or the amount of the test sample is too big). Please, check whether the door is open. When you put the test sample, please do it in small quantity, and in a short period.

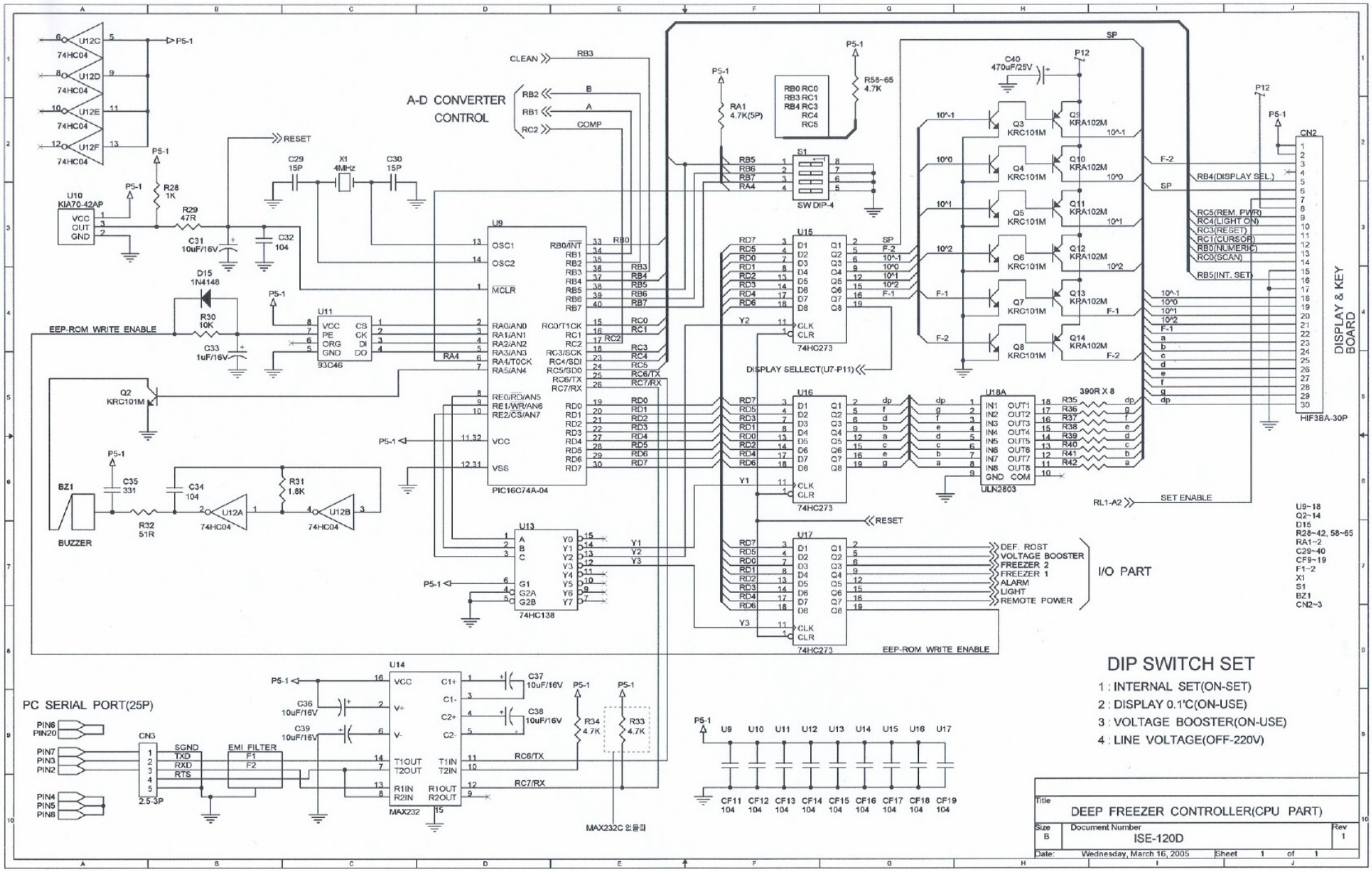
7.2.2. Electrical Trouble Shooting

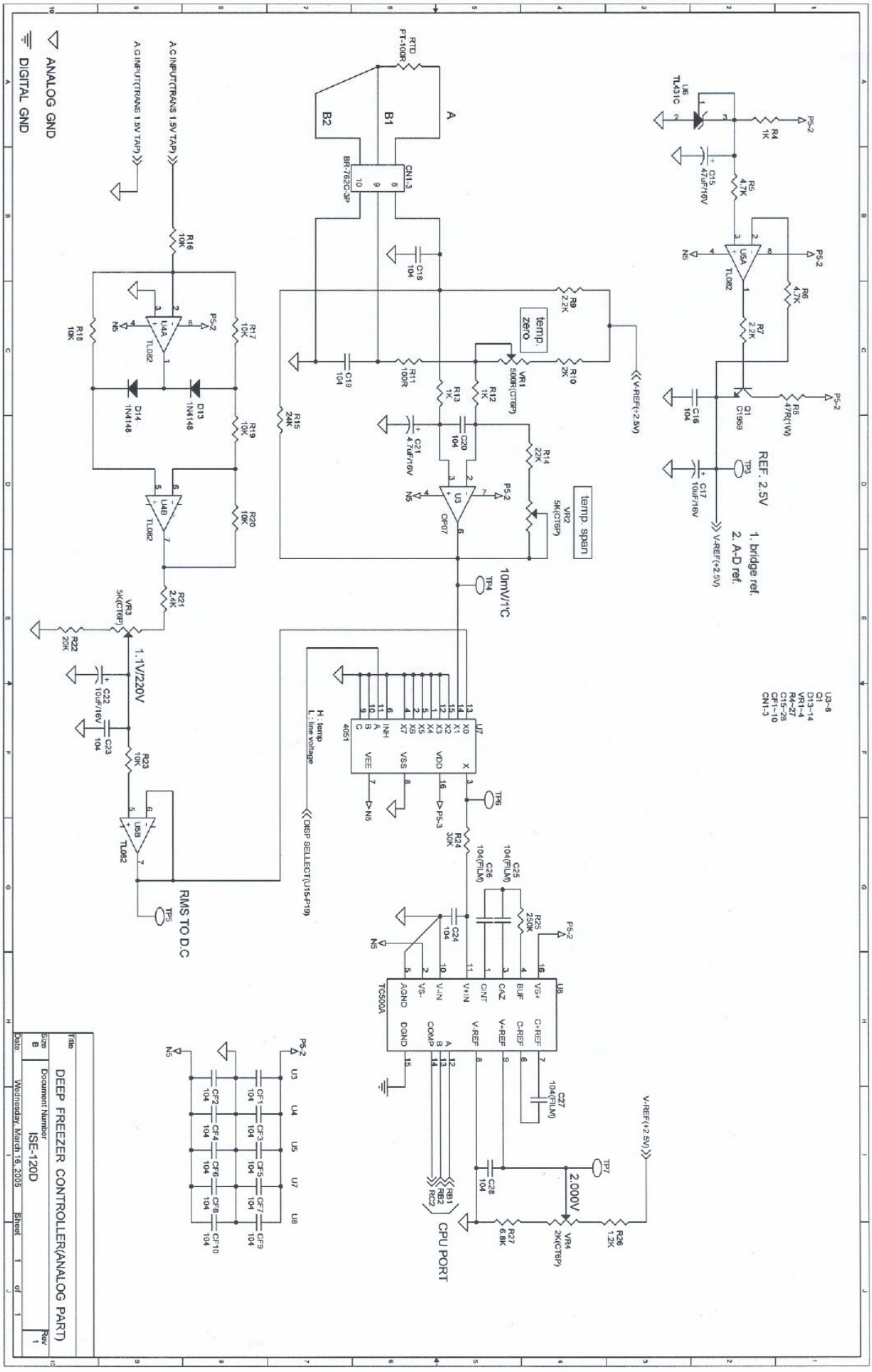


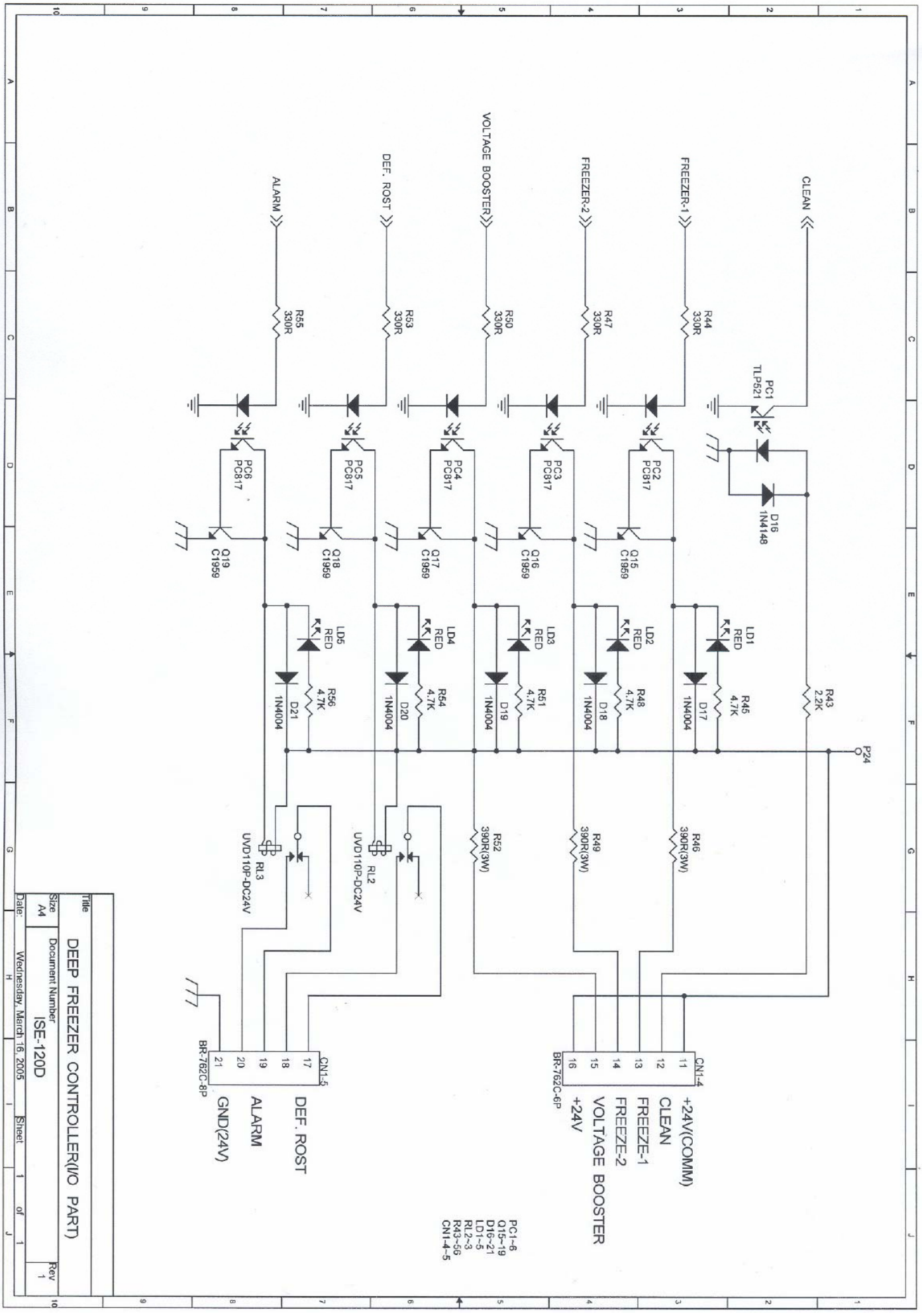

5 minutes elapsed
2nd Comp. check Comp C, Line 4- 6A
Yes
Normal Operation
No
1st pressure H: 120~ 180, L: -5~5 psi
No
1st Refrigerant check
Yes
1st Mg/SW Working
No
MG Coil Check 220 V
No
S.S.R Input voltage DC 24V
No
Display No. 16, 14 DC24V
No
Board Exchange
Yes
Yes
Yes
Yes
Start Capacity Pot Relay Exchange
MG/SW Exchange
S.S.R Exchange
Check Line 27
Comp. Check Amp. Over 10A
No
Normal Operation
T.C Point of contact -20 °C
No
T.C Poing Adjust
Yes
Yes
Compressor Exchange
Line Check

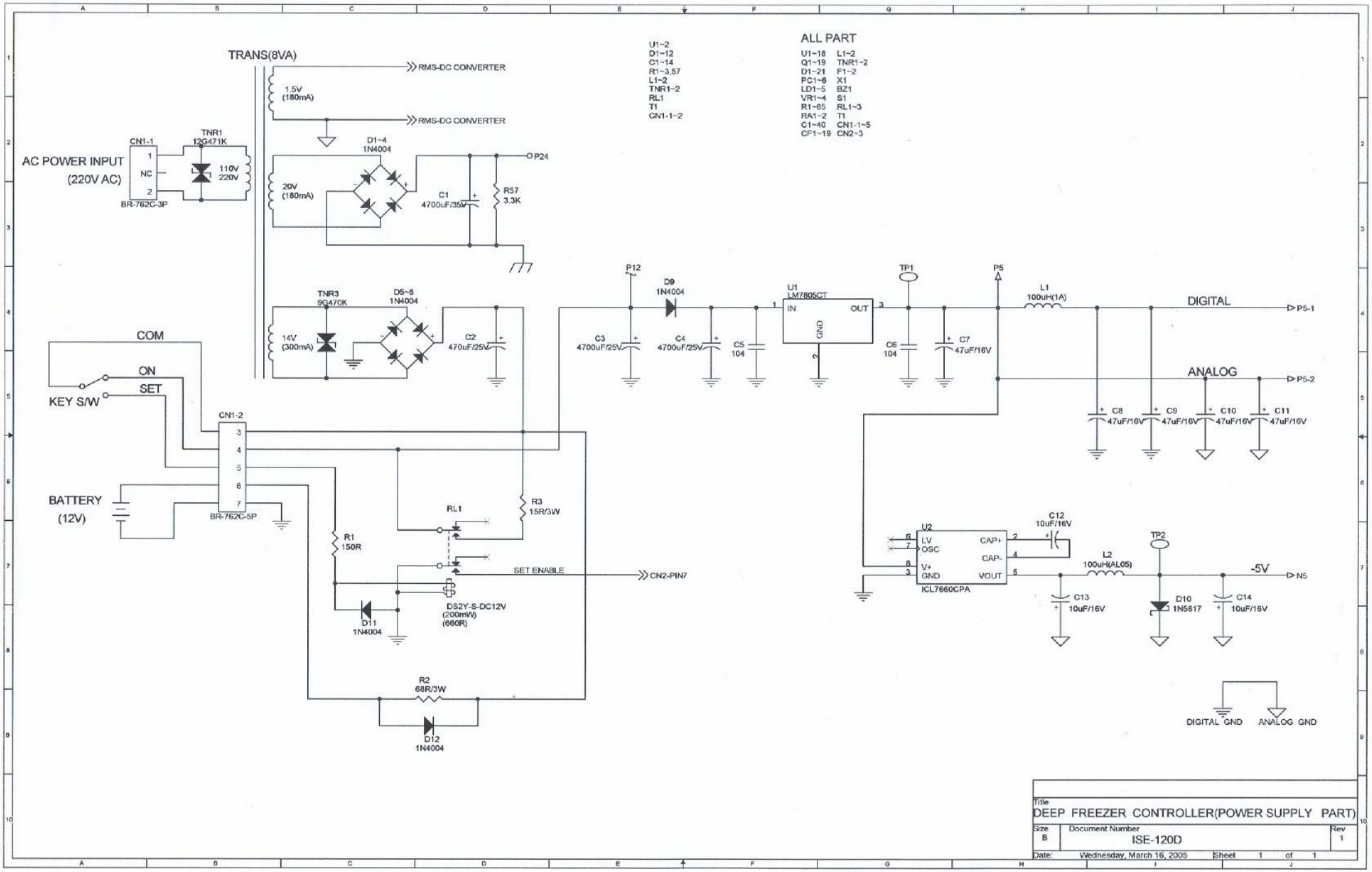
7.2.3 Electrical Schematic, DF85** and DF90**

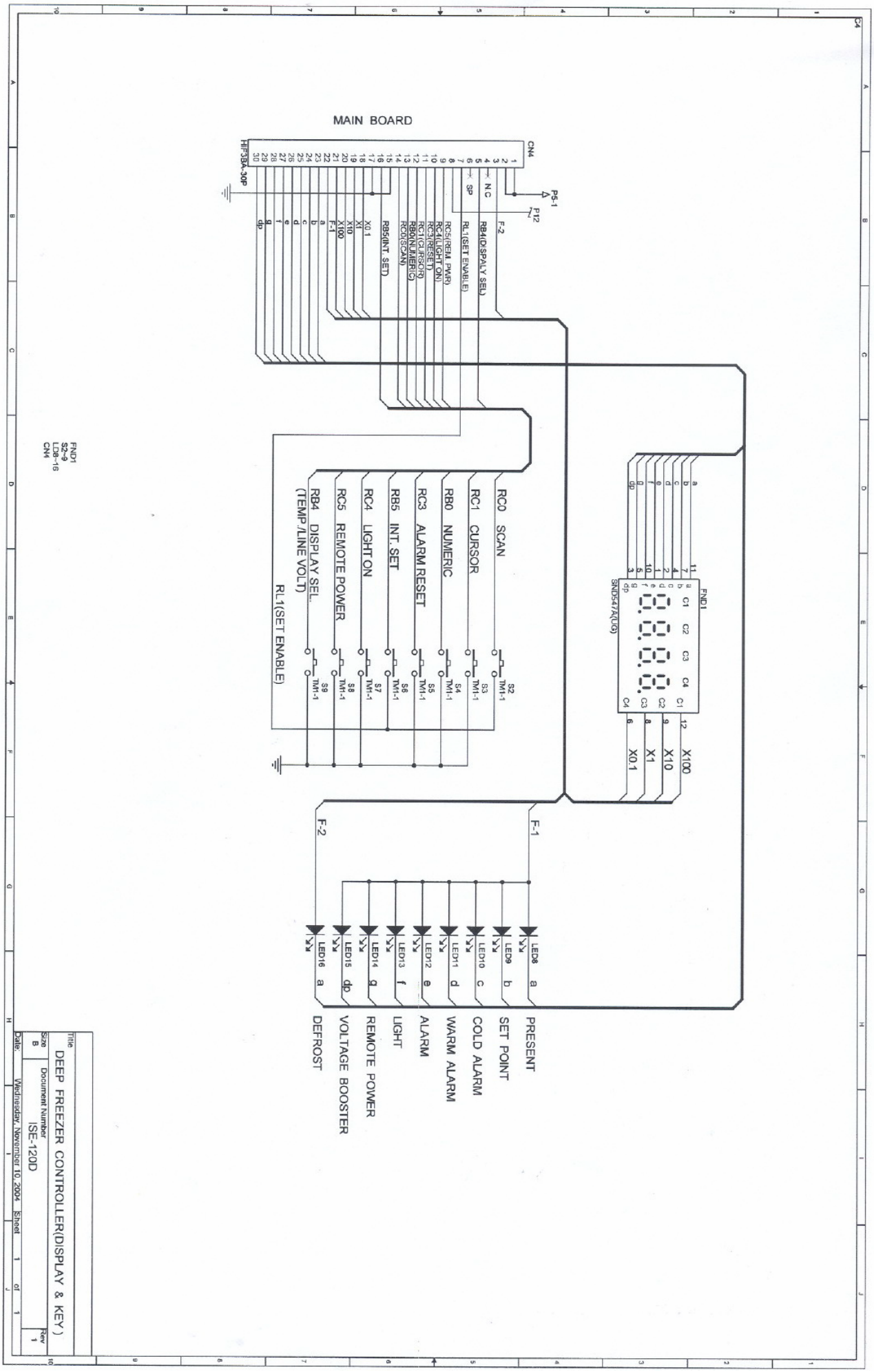


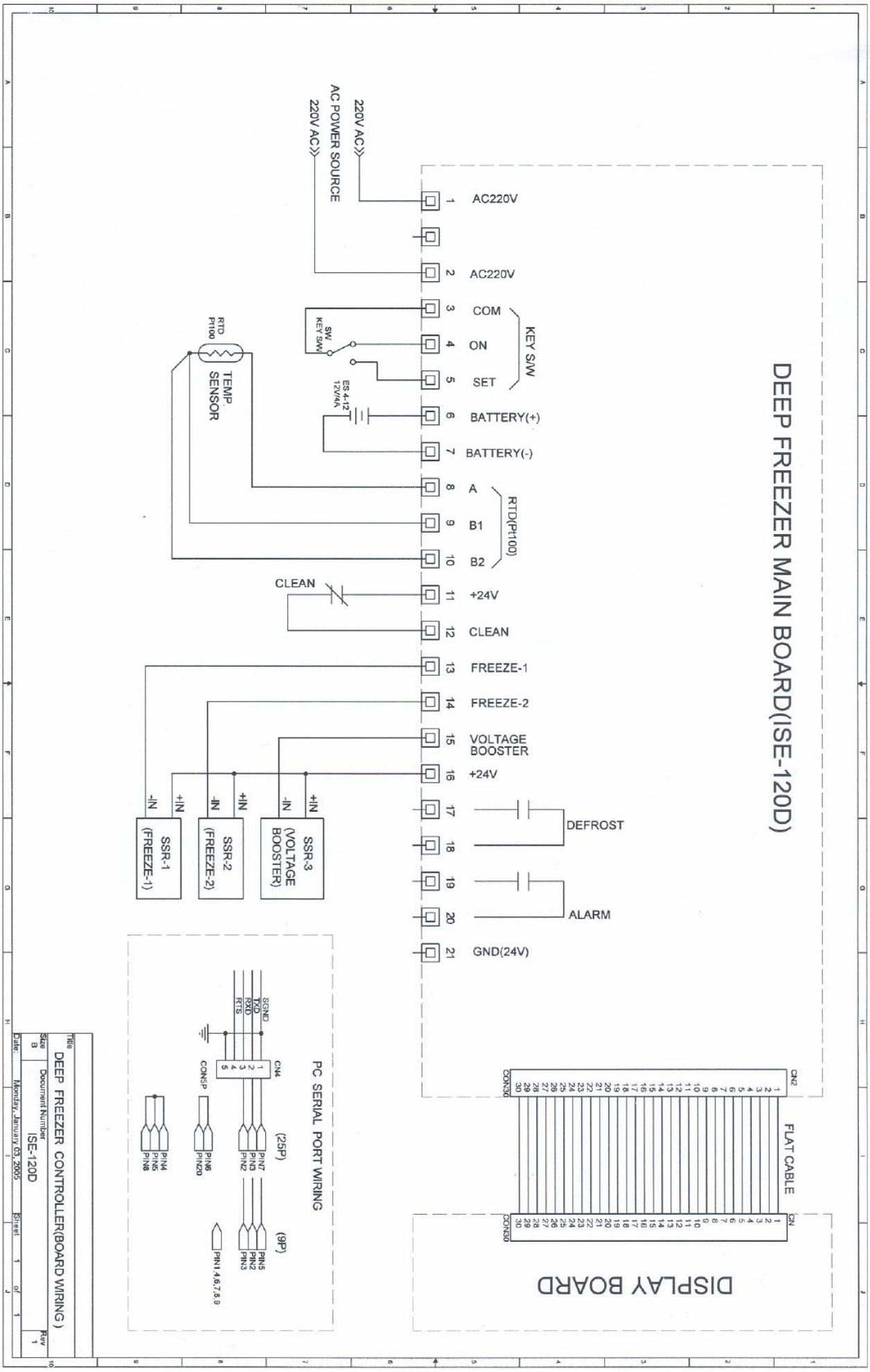

A-D CONVERTER CONTROL
CLEAN
RB3
RB2
B
RB1
A
RC2
COMP
RESET
EEP-ROM WRITE ENABLE
DISPLAY SELLECT(U7-P11)
PIC16C74A-04
93C46
74HC273
74HC138
74HC04
ULN2803
SW DIP-4
KRC101M
KRA102M
DISPLAY & KEY BOARD
HIF3BA-30P
I/O PART
DEF. ROST
VOLTAGE BOOSTER
FREEZER 2
FREEZER 1
ALARM
LIGHT
REMOTE POWER
SET ENABLE
BUZZER
PC SERIAL PORT(25P)
MAX232
MAX232C 인증품
DIP SWITCH SET
1 : INTERNAL SET(ON-SET)
2 : DISPLAY 0.1'C(ON-USE)
3 : VOLTAGE BOOSTER(ON-USE)
4 : LINE VOLTAGE(OFF-220V)
DEEP FREEZER CONTROLLER(CPU PART)
ISE-120D
Wednesday, March 16, 2005


DEEP FREEZER CONTROLLER(ANALOG PART)
ISE-120D
Wednesday, March 16, 2005
REF. 2.5V
1. bridge ref.
2. A-D ref.
temp. zero
temp span
10mV/1℃
1.1V/220V
RMS TO D.C
CPU PORT
2.000V
ANALOG GND
DIGITAL GND
A.C INPUT(TRANS 1.5V TAP)
TL431C
TL082
OP07
TC500A
4051
PT-100R
BR-762C-3P
1N4148
U3-8
C1
D13-14
VR1-4
R4~27
C15~28
CF1~10
CN1-3


CLEAN
FREEZER-1
FREEZER-2
VOLTAGE BOOSTER
DEF. ROST
ALARM
PC1 TLP521
D16 1N4148
R43 2.2K
P24
R44 330R
R47 330R
R50 330R
R53 330R
R55 330R
PC2 PC817
PC3 PC817
PC4 PC817
PC5 PC817
PC6 PC817
Q15 C1959
Q16 C1959
Q17 C1959
Q18 C1959
Q19 C1959
LD1 RED
LD2 RED
LD3 RED
LD4 RED
LD5 RED
R45 4.7K
R48 4.7K
R51 4.7K
R54 4.7K
R56 4.7K
D17 1N4004
D18 1N4004
D19 1N4004
D20 1N4004
D21 1N4004
R46 390R(3W)
R49 390R(3W)
R52 390R(3W)
RL2 UVD110P-DC24V
RL3 UVD110P-DC24V
CN1-4
BR-762C-6P
+24V(COMM)
CLEAN
FREEZE-1
FREEZE-2
VOLTAGE BOOSTER
+24V
CN1-5
BR-762C-8P
DEF. ROST
ALARM
GND(24V)
PC1~6
Q15~19
D16~21
LD1~5
RL2~3
R43~56
CN1-4~5
Title
DEEP FREEZER CONTROLLER(I/O PART)
Size A4
Document Number ISE-120D
Rev 1
Date: Wednesday, March 16, 2005
Sheet 1 of 1

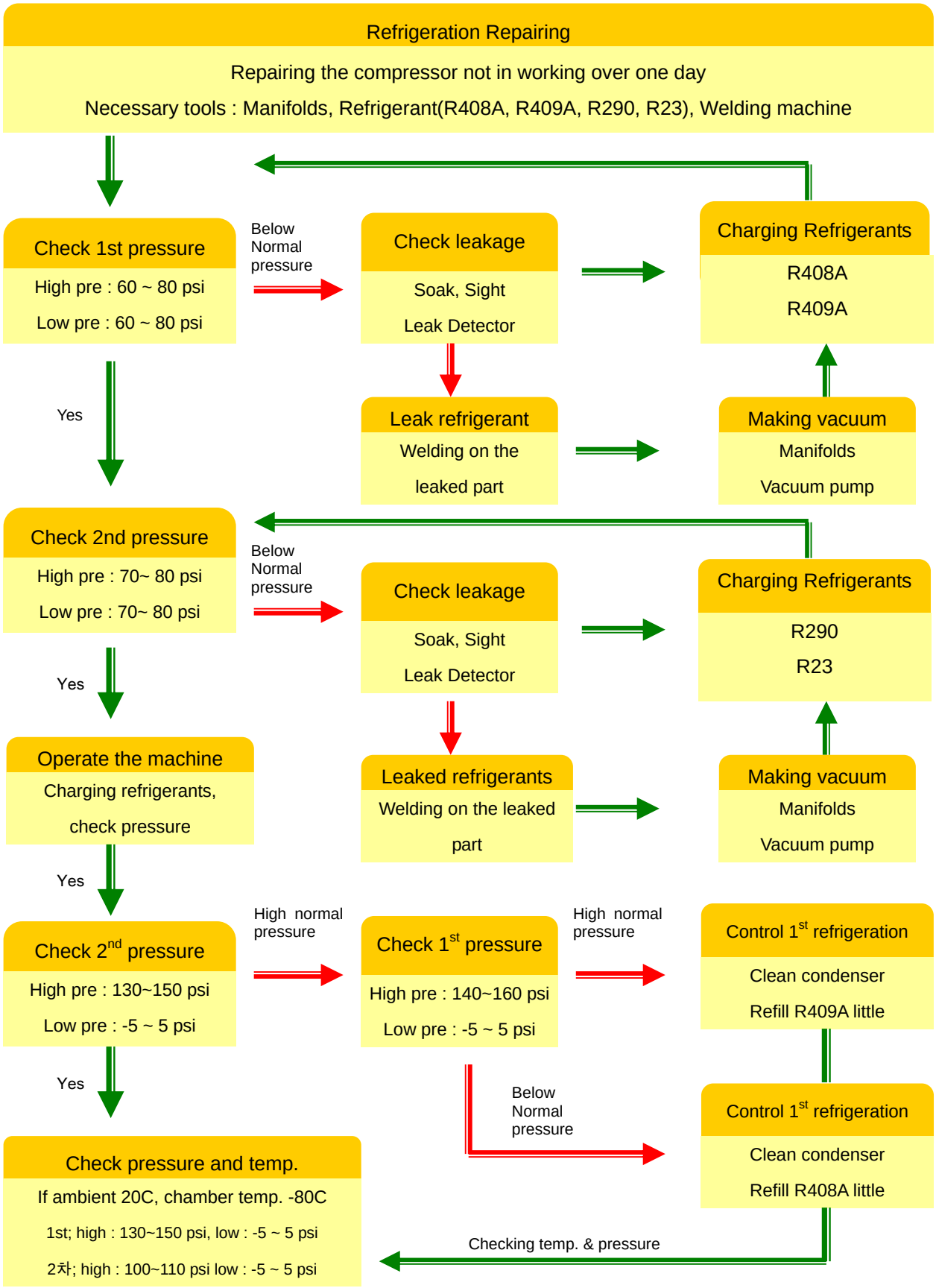

TRANS(8VA)
RMS-DC CONVERTER
RMS-DC CONVERTER
1.5V
(180mA)
20V
(180mA)
14V
(300mA)
AC POWER INPUT
(220V AC)
CN1-1
NC
BR-762C-3P
TNR1
12G471K
110V
220V
D1~4
1N4004
C1
4700uF/35V
R57
3.3K
P24
TNR3
SG470K
D5~8
1N4004
C2
470uF/25V
COM
ON
SET
KEY S/W
CN1-2
BR-762C-5P
BATTERY
(12V)
R1
150R
RL1
R3
15R/3W
SET ENABLE
CN2-PIN7
DS2Y-S-DC12V
(200mW)
(660R)
D11
1N4004
R2
68R/3W
D12
1N4004
P12
D9
1N4004
C3
4700uF/25V
C4
4700uF/25V
C5
104
U1
LM7805CT
IN
OUT
GND
TP1
P5
C6
104
C7
47uF/16V
L1
100uH(1A)
DIGITAL
P5-1
ANALOG
P5-2
C8
47uF/16V
C9
47uF/16V
C10
47uF/16V
C11
47uF/16V
U2
LV
OSC
V+
GND
CAP+
CAP-
VOUT
ICL7660CPA
C12
10uF/16V
L2
100uH(AL05)
TP2
-5V
N5
C13
10uF/16V
D10
1N5817
C14
10uF/16V
DIGITAL GND
ANALOG GND
U1~2
D1~12
C1~14
R1~3,57
L1~2
TNR1~2
RL1
T1
CN1-1~2
ALL PART
U1~18 L1~2
Q1~19 TNR1~2
D1~21 F1~2
PC1~6 X1
LD1~5 BZ1
VR1~4 S1
R1~65 RL1~3
RA1~2 T1
C1~40 CN1-1~5
CF1~19 CN2~3
Title
DEEP FREEZER CONTROLLER(POWER SUPPLY PART)
Size
B
Document Number
ISE-120D
Rev
1
Date:
Wednesday, March 16, 2005
Sheet
1
of
1


MAIN BOARD
CN4
HIF3BA-30P
P5-1
P12
F-2
RB4(DSPALY SEL)
RL1(SET ENABLE)
RC5(REM PWR)
RC4(LIGHT ON)
RC3(RESET ON)
RC1(CURSOR)
RB0(NUMERIC)
RC0(SCAN)
RB5(INT. SET)
X0.1
X1
X10
X100
F-1
SP
NC
FND1
SNDS47A(DS)
X100
X10
X1
X0.1
RC0 SCAN
RC1 CURSOR
RB0 NUMERIC
RC3 ALARM RESET
RB5 INT. SET
RC4 LIGHT ON
RC5 REMOTE POWER
RB4 DISPLAY SEL.
(TEMP./LINE VOLT)
RL1(SET ENABLE)
S2
S3
S4
S5
S6
S7
S8
S9
TM1-1
FND1
S2-9
LD8-16
CN1
LED8
LED9
LED10
LED11
LED12
LED13
LED14
LED15
LED16
PRESENT
SET POINT
COLD ALARM
WARM ALARM
ALARM
LIGHT
REMOTE POWER
VOLTAGE BOOSTER
DEFROST
Title
DEEP FREEZER CONTROLLER(DISPLAY & KEY)
Size
B
Document Number
ISE-120D
Rev
1
Date:
Wednesday, November 10, 2004
Sheet
1
of
1

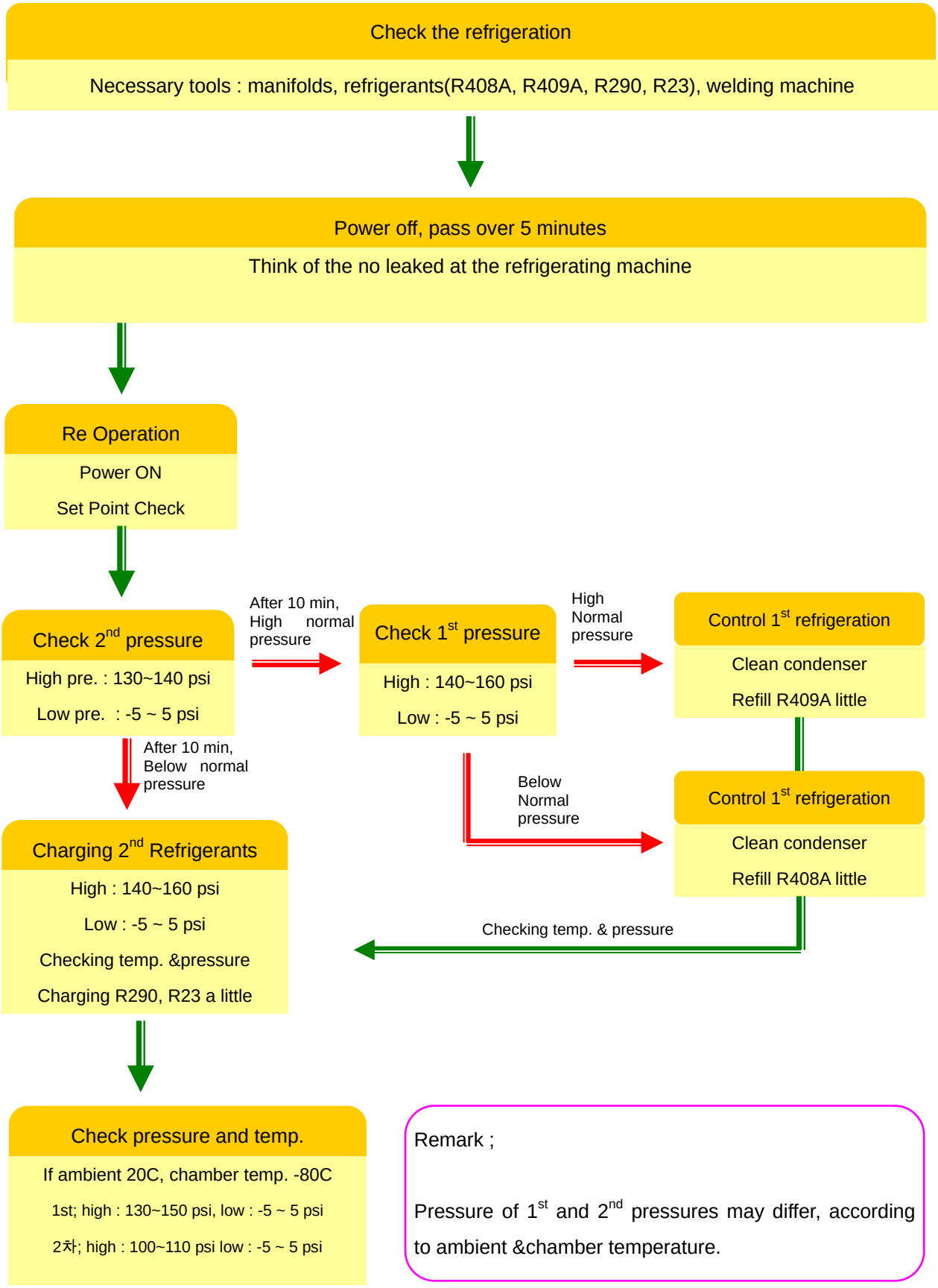

DEEP FREEZER MAIN BOARD(ISE-120D)
220V AC》
AC POWER SOURCE
220V AC》
AC220V
AC220V
COM
ON
SET
KEY S/W
BATTERY(+)
BATTERY(-)
A
B1
B2
RTD(Pt100)
CLEAN
+24V
CLEAN
FREEZE-1
FREEZE-2
VOLTAGE BOOSTER
+24V
DEFROST
ALARM
GND(24V)
RTD P100
TEMP SENSOR
SW KEY S/W
ES 4-i2 12V/4A
SSR-1 (FREEZE-1)
SSR-2 (FREEZE-2)
SSR-3 (VOLTAGE BOOSTER)
+IN
-IN
PC SERIAL PORT WIRING
SGND
TXD
RXD
RTS
CN4
CON5P
(25P)
(9P)
PIN4
PIN5
PIN6
PIN20
PIN7
PIN3
PIN2
PIN5
PIN2
PIN3
PIN1,4,6,7,8,9
DISPLAY BOARD
FLAT CABLE
CN2
CON30
CN
CON30
Title
DEEP FREEZER CONTROLLER(BOARD WIRING)
Size B
Document Number
ISE-120D
Rev 1
Date
Monday, January 03, 2005
Sheet 1 of 1

7.3 Refrigerational Trouble Shooting

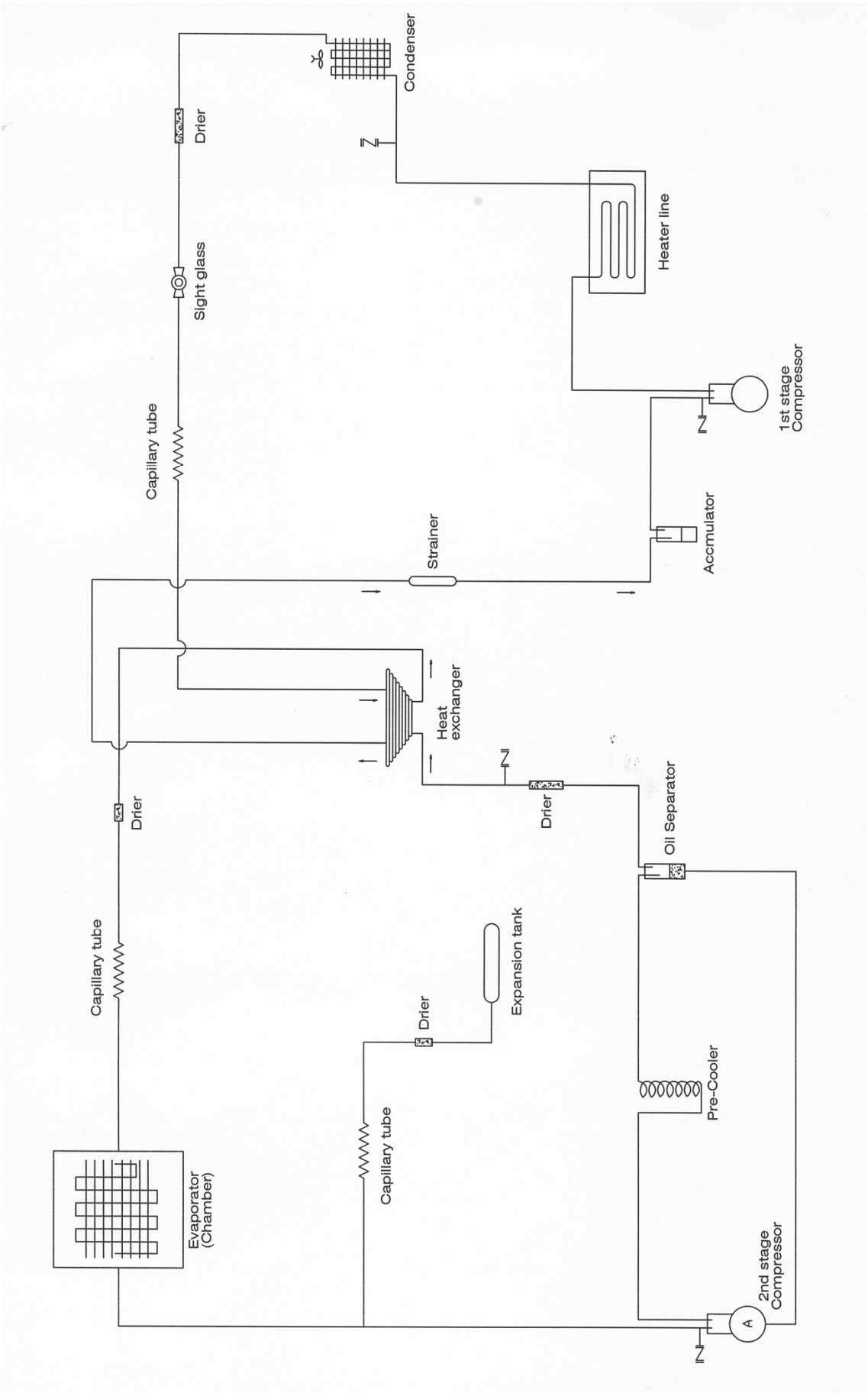
7.3.1 Compressor not Running



7.3.2 Compressor is running but with wrong temperature


Check the refrigeration
Necessary tools : manifolds, refrigerants(R408A, R409A, R290, R23), welding machine
Power off, pass over 5 minutes
Think of the no leaked at the refrigerating machine
Re Operation
Power ON
Set Point Check
Check 2nd pressure
High pre. : 130~140 psi
Low pre. : -5 ~ 5 psi
After 10 min, High normal pressure
Check 1st pressure
High : 140~160 psi
Low : -5 ~ 5 psi
High Normal pressure
Control 1st refrigeration
Clean condenser
Refill R409A little
After 10 min, Below normal pressure
Below Normal pressure
Control 1st refrigeration
Clean condenser
Refill R408A little
Charging 2nd Refrigerants
High : 140~160 psi
Low : -5 ~ 5 psi
Checking temp. &pressure
Charging R290, R23 a little
Checking temp. & pressure
Check pressure and temp.
If ambient 20C, chamber temp. -80C
1st; high : 130~150 psi, low : -5 ~ 5 psi
2차; high : 100~110 psi low : -5 ~ 5 psi
Remark ;
Pressure of 1st and 2nd pressures may differ, according to ambient &chamber temperature.

7.3.3 Refrigeration drawing and prinipal of the cascade refrigeration system



Principal of Cascade Refrigeration System:

The cascade refrigeration system is designed to use different refrigerants which have different boiling points in one system in order to reach ultra low temperatures (-60 down to –150 °C range). Therefore a cascade cooling system needs two sepeate cooling systems (compressors). Each cooling system (compressor) works simultaneously.

The first stage compressor exists to condense the high pressure line of the second stage compressor. The second stage comprressor is the main system which maintains the ultra low temperature of the freezer.

The refrigerant of the first stage compressor is compressed. This compressed refrigerant is cooled by the air cooled condenser. The condensed refrigerant is dried by a drier. The dried refrigerant evaporates in the evaporator by a capillary tube (low pressure, low temperature) The heat exchanger is cooled down to less than -40°C. This heat exchanger is now used to condensate the compressed refrigerant coming from the second stage compressor. The strainer removes dirt from the evaporated refrigerant. Because we use a liquid separator, liquid refrigerant is prevented from sucking into the compressor.

The second stage refrigerant is compressed in the second stage compressor. The compressed refrigerant is pre-cooled by passing through a pre-cooler. After passing the oil separator and drier, it is condensed in the heat exchanger (cooled to -40°C by the first stage cooling system). The condensed refrigerant goes through strainer, and passing through the second stage capillary tube. Bacuse of this capillary tube (low temperature, low pressure) it is evaporated in the evaporator and cools the inner chamber to temperatures down to -86°C.

Summary:

- Operation of first compressor
- Cooling of first stage heat exchanger down to -40°C
- Operation of second stage compressor
- Second stage refrigeration is condensing in the heat exchanger of fist stage
- Cooling the inner chamber by the second stage refrigeration down to -86°C.

7.3.4 Charging Quantity and Type of Refrigerants

7.3.4.1 Refrigerant Quantity for Chest Models (all data at +25ºC ambient temperatures)

Model	The first stage				The second stage				Remarks
	Refrigerant	Charging Quantity(g)	Static Pressure	Running Pressure	Refrigerant	Charging Quantity(g)	Static Pressure	Running Pressure	compressors
DF4507	R-290	+/- 250	Approx. 4 bar	140psi pressure 5psi suction					½ HP, L262B single stage system
DF4510	R-290	+/- 250							
DF4514	R-290	+/- 250							
DF4517	R-290	+/- 250							
DF4520	R-290	+/- 250		150psi 5psi					1 HP, L452B single stage system
DF9007	R-290	170		155psi pressure 10psi suction	R170	92	Approx. 3-5 bar	120psi pressure 0 psi suction	2 x ½ HP, L262B cascade system
DF9010	R-290	170			R170	92			
DF9014	R-290	175			R170	94			
DF9017	R-290	180		160psi pressure 10psi suction	R170	96			
DF9020	R-290	184			R170	96	Approx. 3-5 bar		2 x 1 HP, L452B cascade system

7.3.4.2 Refrigerant Quantity for Upright Models (all data at +25ºC ambient temperatures)

Model	The first stage				The second stage				Remarks
	Refrigerant	Charging Quantity(g)	Static Pressure	Running Pressure	Refrigerant	Charging Quantity(g)	Static Pressure	Running Pressure	compressors
DF3510	R-290	+/- 270	Approx. 4 bar	140psi pressure 5psi suction					½ HP, L262B single stage system
DF3514	R-290	+/- 270							
DF3517	R-290	+/- 270							
DF3520	R-290	+/- 270							1 HP, L452B single stage system
DF3524	R-290	+/- 270		150psi 5psi					
DF8510	R-290	170		150psi pressure 0psi suction	R170	92	Approx. 3-5 bar	120psi pressure 0 psi suction	2 x ½ HP, L262B cascade system
DF8514	R-290	175			R170	94			
DF8517	R-290	180			R170	96			
DF8520	R-290	184		155psi pressure 1psi suction	R170	96	Approx. 3-5 bar		2 x 1 HP, L452B cascade system
DF8524	R-290	186			R170	100			

Above tables are for reference only. In case of re-charging please contact your local ilShin service engineer

7.4 Registration of Service

* Before you register for the service, please read the following information:

1. The unit does not operate at all.

O Please, check the power supply (230V) plug connection.
O Please, check whether the temperature is set in a right way.
O Please, check whether the unit is too close to a heating object.
O Please, check whether the rear side of the unit is too close to the wall.
O Please, check whether the condenser is blocked by dust
(Remedy: wipe off the dust by soft brush)
O Please, check whether a big amount of test sample is inserted within a few hours. (Remedy: this is a temporal phenomenon, please just wait)

2. Loud running noise

O Please, check whether the floor is even.
O Please, check whether the noise is coming from the compressor.
* The noise of the compressor is bigger than that of household refrigerators
O Do you hear a turbo sound?
* This unit is equipped with a fan motor which is used for air cooling system. when the fan motor is running, you can hear some noise.
O Do you hear a knocking sound?
* This sound originates from the parts of the unit, when they are expanded or shrunk.
O Do you hear water stream?
* The unit is equipped with circulation of refrigerant. You can hear the refrigerant stream through the circulation. It is not a technical problem.

3. A layer of ice has formed in the inside wall of the deep freezer

O Put the samples with distances for good ventilation
O If a sample contains much moisture, then put a top on it, or keep it in wrap.
O Please, check whether the door is closed.
O Please, reduce the times to open the door.

8. Warranty and contact information

8.1 International Warranty

The warranty period starts at the moment the unit leaves the production facility. After this date five year warranty on the parts is valid. During these first 5 years component parts proven to be defective can be send to your local dealer and will be covered by this 5 years warranty on parts only. The compressors in the system are covered also by a 5 year warranty. Expendable items, i.e., glass, filters, pilot lights, light bulbs and door gaskets are excluded from this warranty. IlShin will not be liable for any indirect or consequential damages including, without limitation, damages relating to lost profits or loss of products.

8.2 Conditions and terms of sale

All prices are ex works from the ilShin Europe Warehouse in The Netherlands, excluding insurance, seaworthy packing and customs duty. Effective prices are those valid on date of confirmation of order. All specifications mentioned in the price list are based on 230 V / 50Hz power supply. Continuing research and improvements may result in specification changes. Errors and misprints excepted

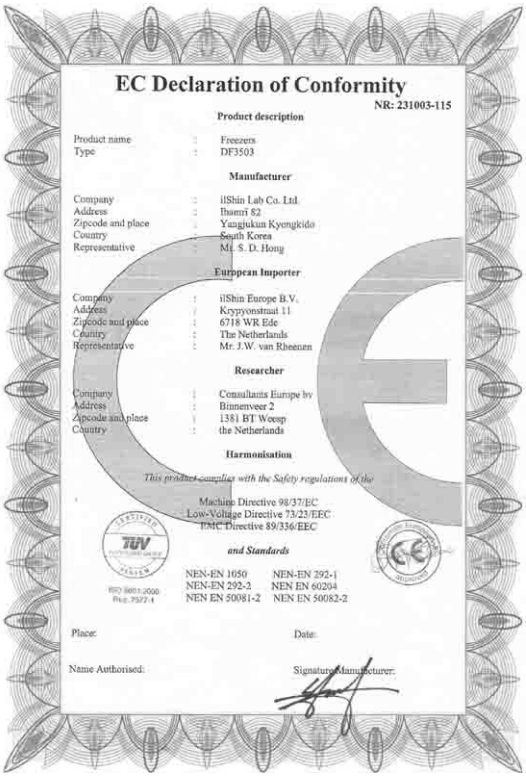
8.3 Contact information

In case service or sales back up is needed please do not hesitate to contact your local ilShin Dealer:

Or contact the European ilShin Headquarter:

ilShin Europe
Kryptonstraat 11
6718 WR EDE
The Netherlands
info@ilshineurope.com
www.ilshineurope.com
tel: +31 318 64 64 81
fax: +31 318 64 60 34

9. CE Declaration of Conformity



EC Declaration of Conformity

NR: 231003-115

Product description

Product name : Freezers
Type : DF3503

Manufacturer

Company : iiShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : iiShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

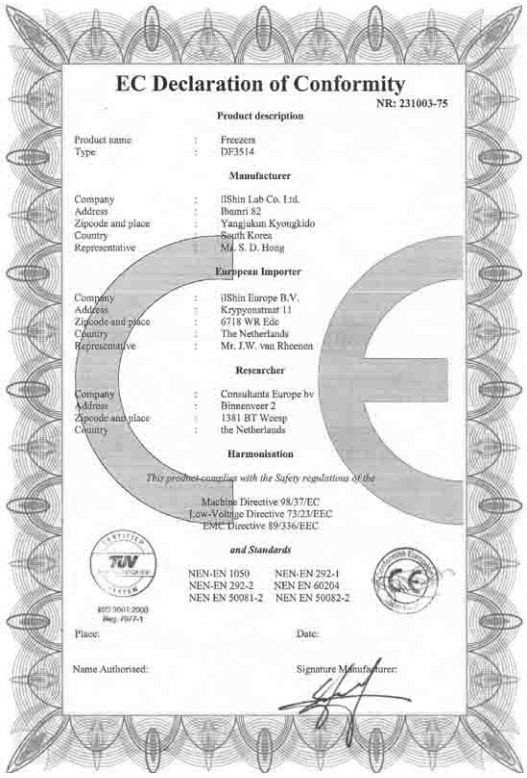
and Standards

NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF3510



EC Declaration of Conformity

NR: 231003-75

Product description

Product name : Freezers
Type : DF3514

Manufacturer

Company : iiShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : iiShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

and Standards

NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF3514

EC Declaration of Conformity

NR: 231003-85

Product description

Product name : Freezers
Type : DF3517

Manufacturer

Company : iiShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : iiShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

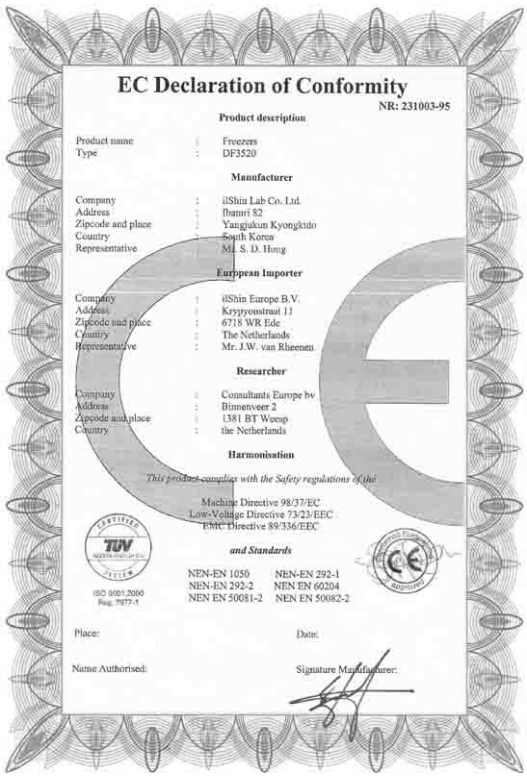
and Standards

NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF3517



EC Declaration of Conformity

NR: 231003-95

Product description

Product name : Freezers
Type : DF3520

Manufacturer

Company : iiShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : iiShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

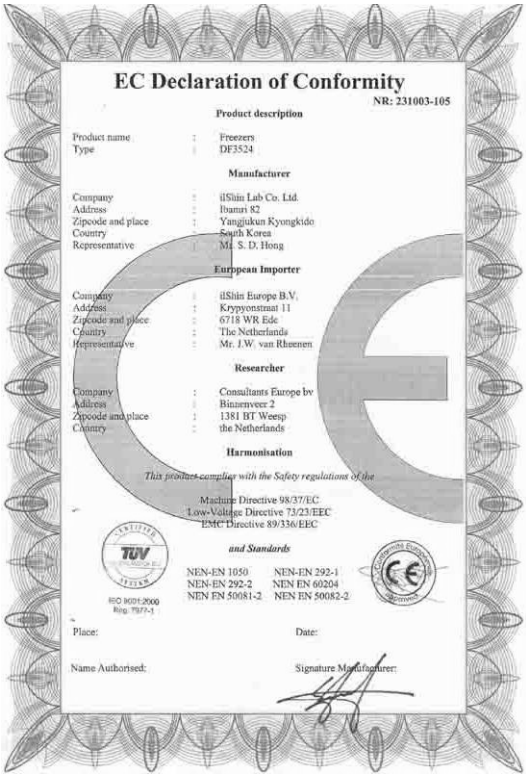
and Standards

NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF3520



EC Declaration of Conformity

NR: 231003-105

Product description

Product name : Freezers
Type : DF3524

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

and Standards

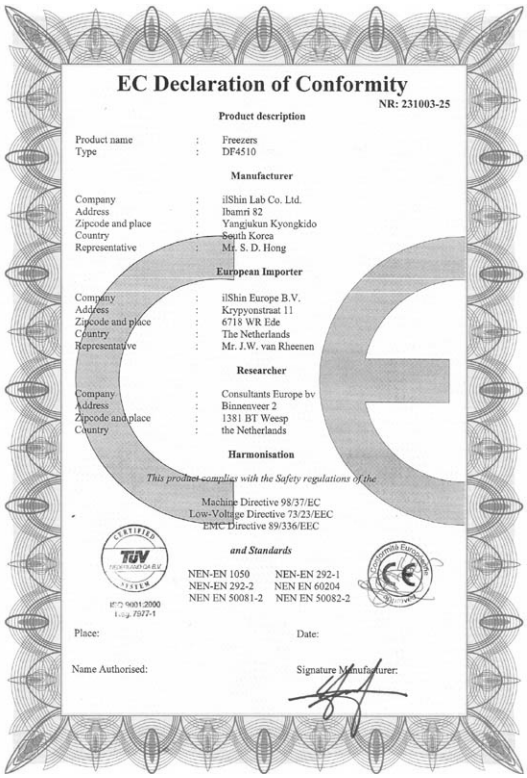
NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

ISO 9001:2000
Reg. 7977-1

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF3524



EC Declaration of Conformity

NR: 231003-25

Product description

Product name : Freezers
Type : DF4510

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

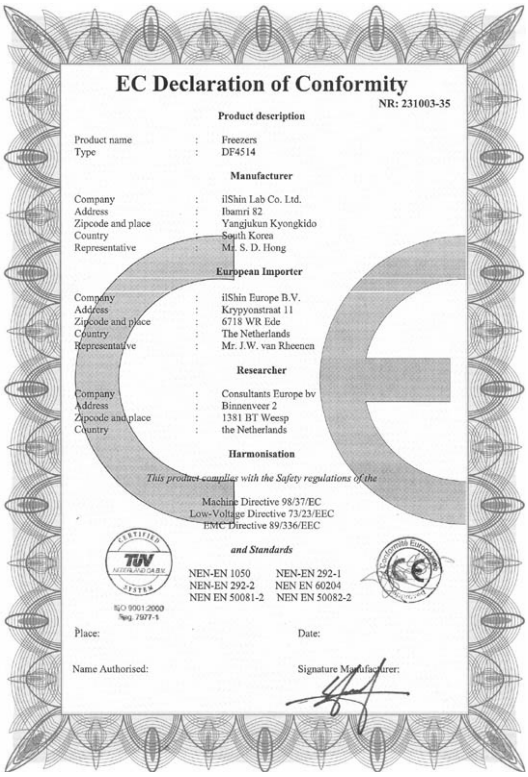
and Standards

NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF4510



EC Declaration of Conformity

NR: 231003-35

Product description

Product name : Freezers
Type : DF4514

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

and Standards

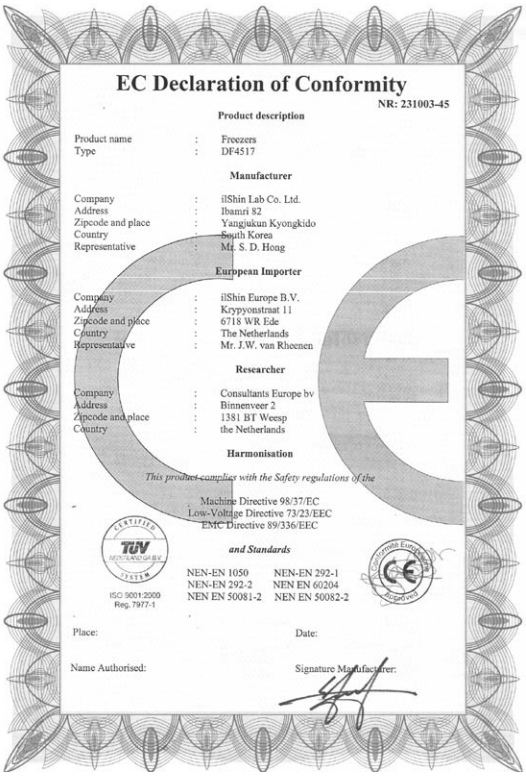
NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

ISO 9001:2000
Reg. 7977-1

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF4514



EC Declaration of Conformity

NR: 231003-45

Product description

Product name : Freezers
Type : DF4517

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

and Standards

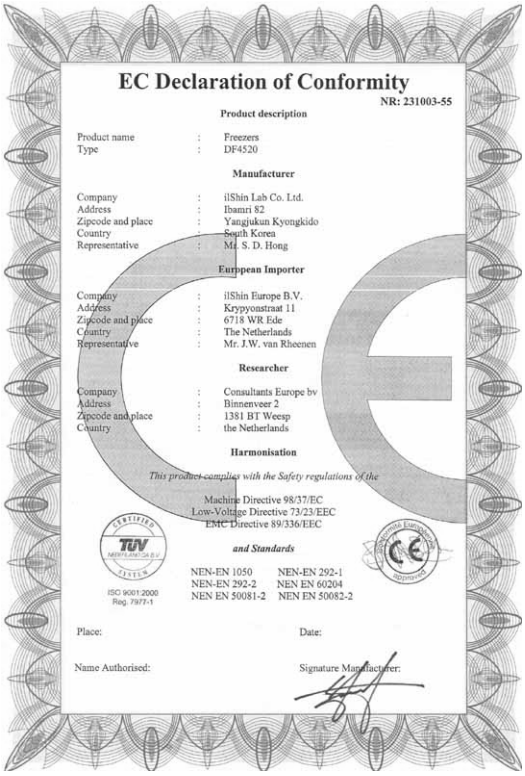
NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

ISO 9001:2000
Reg. 7977-1

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF4517



EC Declaration of Conformity

NR: 231003-55

Product description

Product name : Freezers
Type : DF4520

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

and Standards

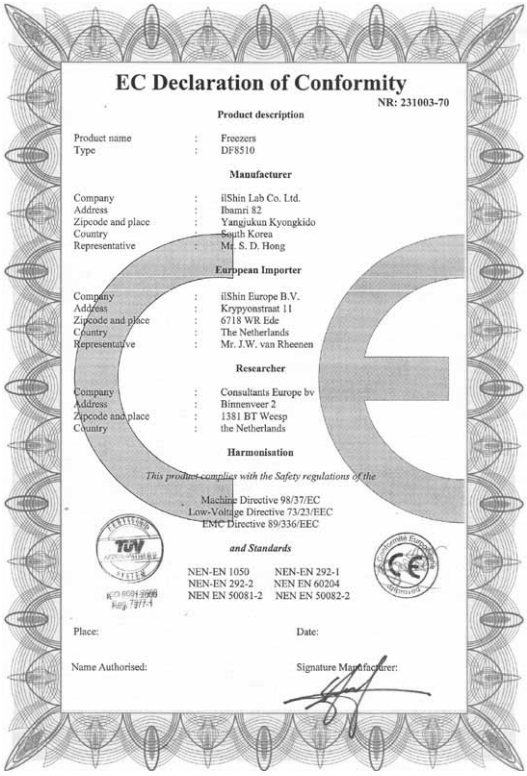
NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

ISO 9001:2000
Reg. 7977-1

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF4520



EC Declaration of Conformity

NR: 231003-70

Product description

Product name : Freezers
Type : DF8510

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

and Standards

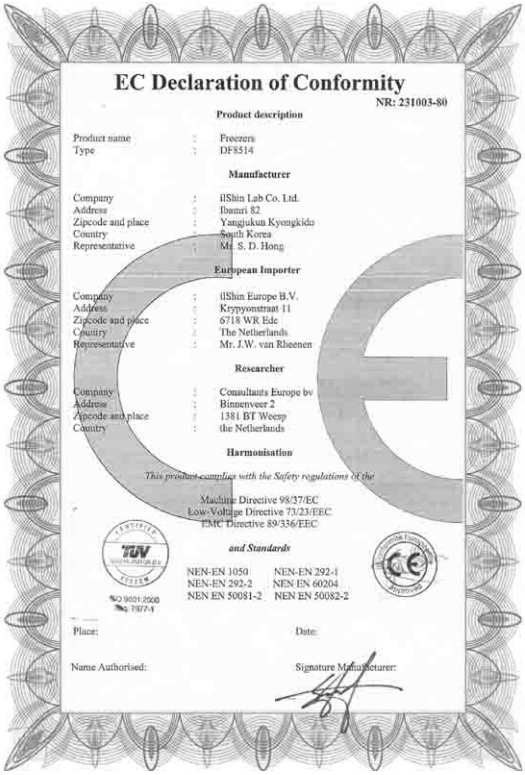
NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

Reg. 7977-1

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF8510



EC Declaration of Conformity

NR: 231003-80

Product description

Product name : Freezers
Type : DF8514

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

and Standards

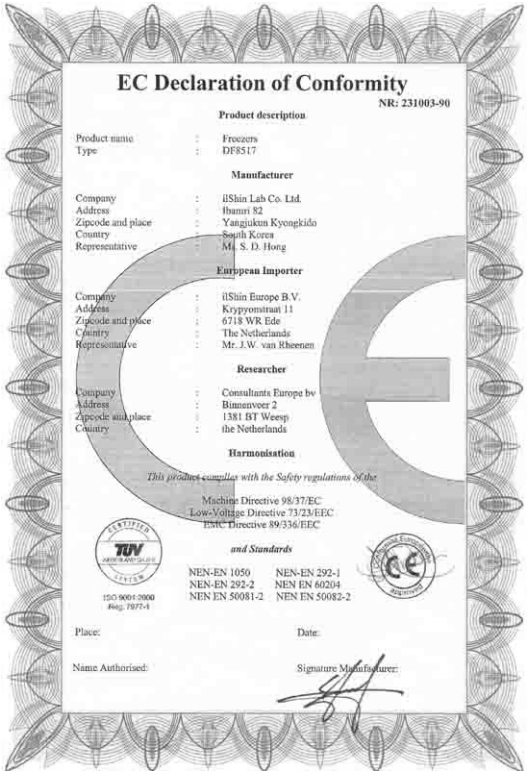
NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

Reg. 7977-1

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF8514



EC Declaration of Conformity

NR: 231003-90

Product description

Product name : Freezers
Type : DF8517

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

and Standards

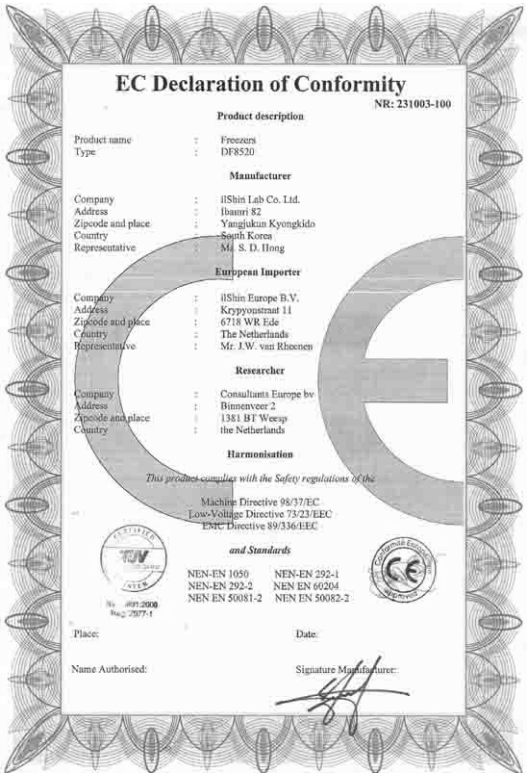
NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

ISO 9001:2000
Reg. 7977-1

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF8517



EC Declaration of Conformity

NR: 231003-100

Product description

Product name : Freezers
Type : DF8520

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

and Standards

NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF8520

EC Declaration of Conformity

NR: 231003-110

Product description

Product name : Freezers
Type : DF8524

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

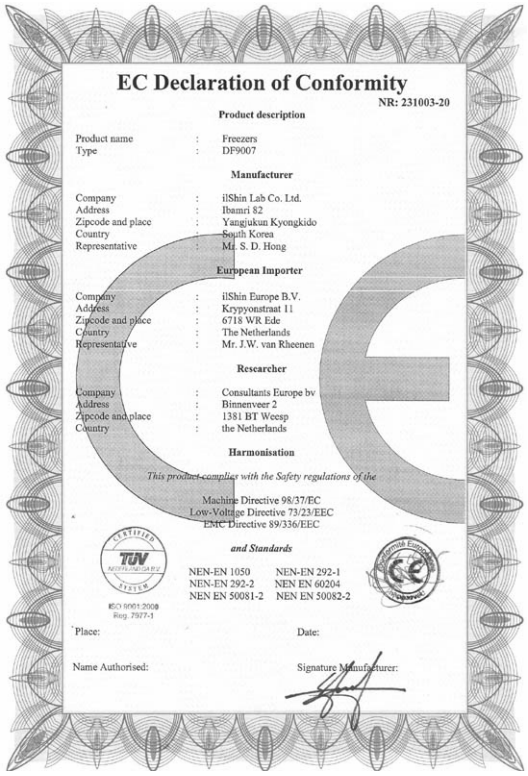
and Standards

NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF8524



EC Declaration of Conformity

NR: 231003-20

Product description

Product name : Freezers
Type : DF9007

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

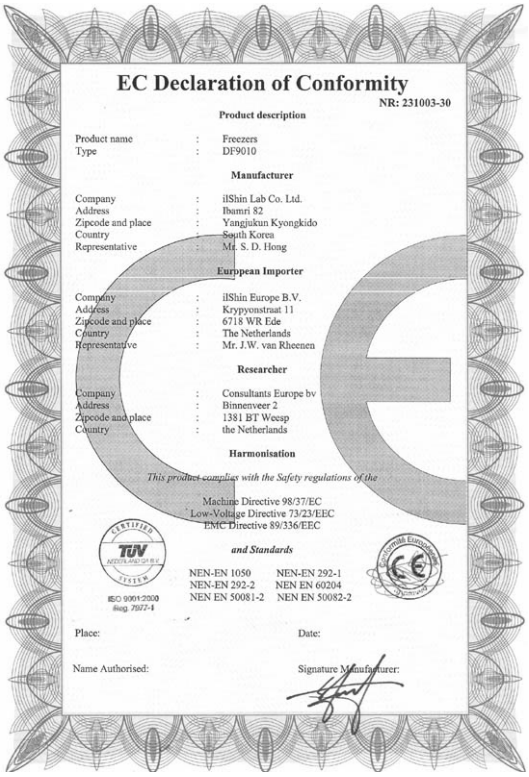
and Standards

NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF9007



EC Declaration of Conformity

NR: 231003-30

Product description

Product name : Freezers
Type : DF9010

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

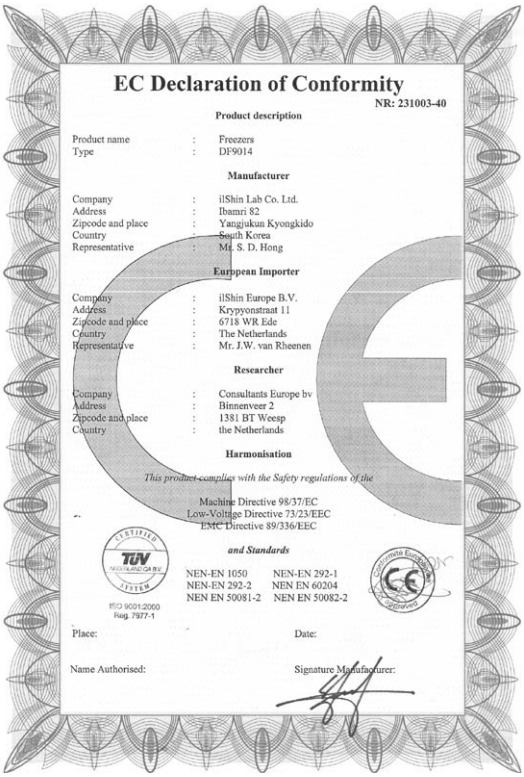
and Standards

NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF9010



EC Declaration of Conformity

NR: 231003-40

Product description

Product name : Freezers
Type : DF9014

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

and Standards

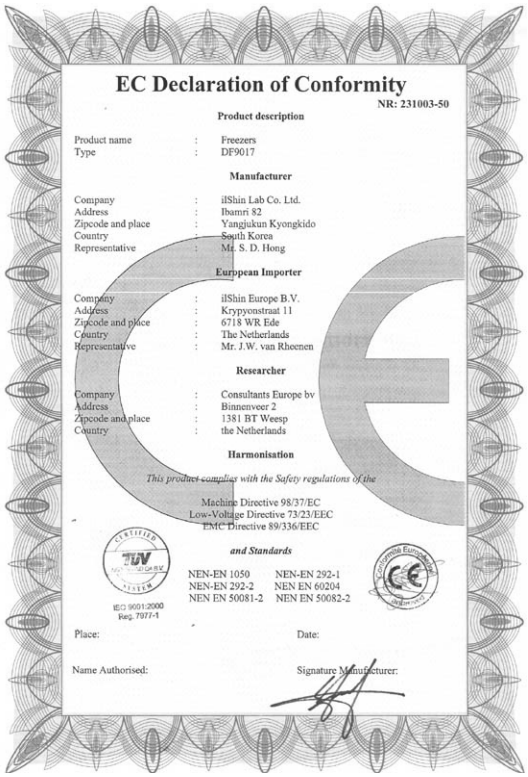
NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

ISO 9001:2000
Reg. 7977-1

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF9024



EC Declaration of Conformity

NR: 231003-50

Product description

Product name : Freezers
Type : DF9017

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

and Standards

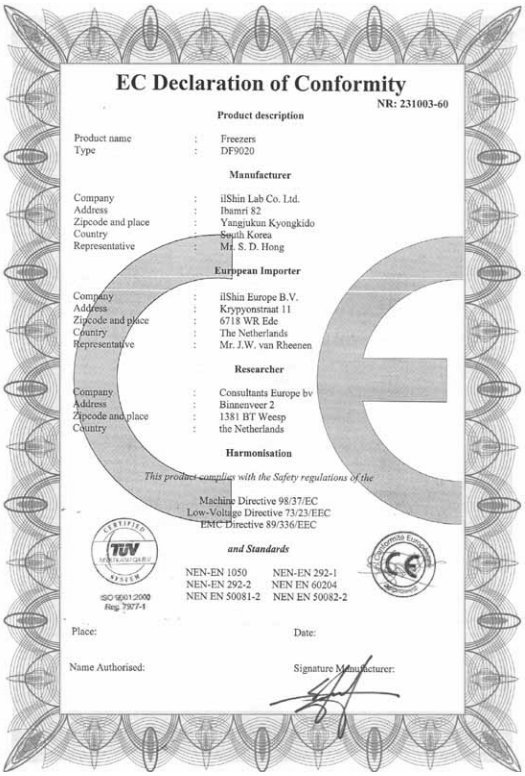
NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

ISO 9001:2000
Reg. 7977-1

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF9017



EC Declaration of Conformity

NR: 231003-60

Product description

Product name : Freezers
Type : DF9020

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

and Standards

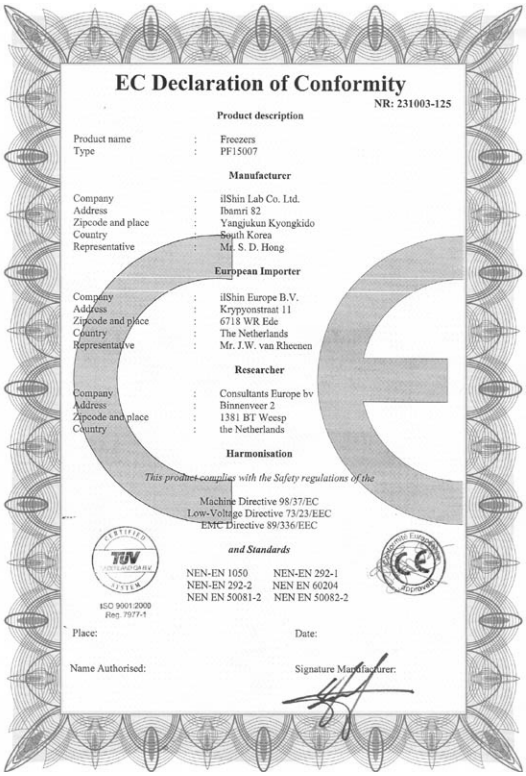
NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

ISO 9001:2000
Reg. 7977-1

Place: Date:

Name Authorised: Signature Manufacturer:

Model : DF9017



EC Declaration of Conformity

NR: 231003-125

Product description

Product name : Freezers
Type : PF15007

Manufacturer

Company : ilShin Lab Co. Ltd.
Address : Ibamri 82
Zipcode and place : Yangjukun Kyongkido
Country : South Korea
Representative : Mr. S. D. Hong

European Importer

Company : ilShin Europe B.V.
Address : Krypyonstraat 11
Zipcode and place : 6718 WR Ede
Country : The Netherlands
Representative : Mr. J.W. van Rheenen

Researcher

Company : Consultants Europe bv
Address : Binnenveer 2
Zipcode and place : 1381 BT Weesp
Country : the Netherlands

Harmonisation

This product complies with the Safety regulations of the

Machine Directive 98/37/EC
Low-Voltage Directive 73/23/EEC
EMC Directive 89/336/EEC

and Standards

NEN-EN 1050 NEN-EN 292-1
NEN-EN 292-2 NEN EN 60204
NEN EN 50081-2 NEN EN 50082-2

ISO 9001:2000
Reg. 7977-1

Place: Date:

Name Authorised: Signature Manufacturer:

Model : PF15007

ilShin® Europe

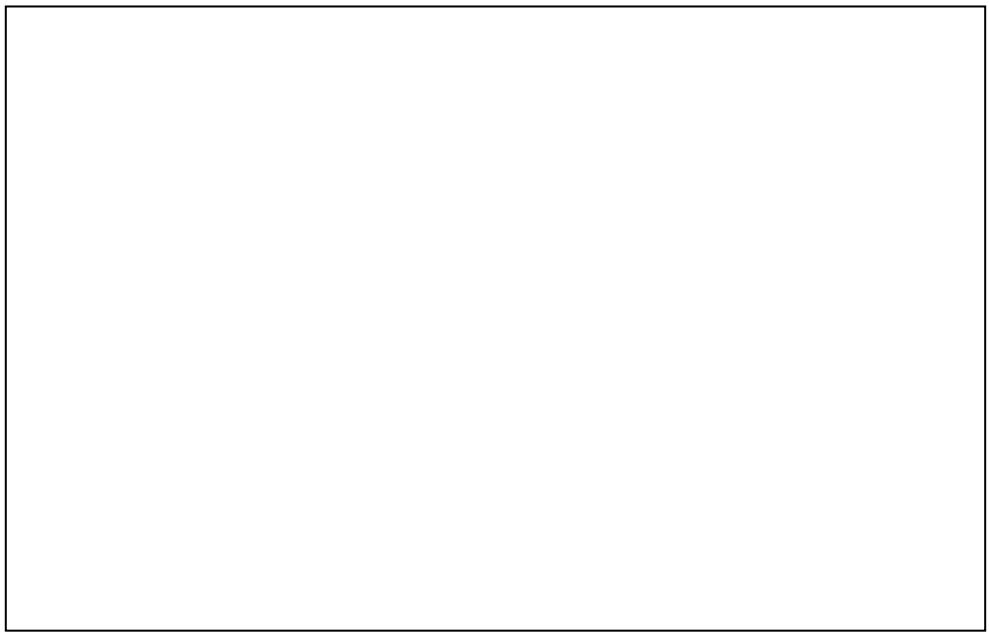
Corporate identity of ilShin: ONE TRUST

ilShin is a combination of words originating from the traditional Korean language. The first part of the word, ***il,*** means ONE. The second part of the word, ***Shin,*** means TRUST.

This explains our main value of the company ilShin. We have a strong trust in the quality of our innovative products. The main goal of our fast and reliable worldwide service team is to maintain satisfied customers. As a result also our customers keep the trust in continuous innovation, **ilShin!**

Delivering quality through service

Your local ilShin Dealer:



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